



## Soil Testing Results

515 North Peshtigo Ct. (Parcel 24)  
Chicago, Illinois

*Prepared For:*  
River East P24, LLC  
350 West Hubbard, Suite 300  
Chicago, IL 60610  
Attn: Mr. Don Biernacki

*Project Number:*  
Pioneer Project # 07-1550-103/104

*Date Submitted:*  
January 4, 2011



700 N Sacramento Blvd. Suite 101  
Chicago IL 60612  
773.722.9200 Phone - 773.722.9201 Fax  
[www.pioneerEES.com](http://www.pioneerEES.com)

January 4, 2011

River East P24, LLC  
350 West Hubbard, Suite 300  
Chicago, IL 60610  
Attn: Mr. Don Biernacki

RE: Soil Testing Results  
515 North Peshtigo Ct. (Parcel 24)  
Chicago, Illinois  
Pioneer Project # 07-1550-103/104

Dear Mr. Biernacki:

This letter is intended to discuss the sampling methodology, geologic conditions, and results of the site investigation activities performed by Pioneer Environmental Services, LLC (Pioneer) at the above captioned subject site. The investigation was performed in late 2008 to determine whether or not radioactive thorium is present on the subject property prior to the planned redevelopment of the site; however, the project was placed on-hold as a result of the economic downturn. At the request of the owner, the report is being submitted, in an effort to receive input from US EPA prior to the anticipated April 2011 groundbreaking for the new redevelopment.

#### **Background**

Historical research has identified that Lindsay Light and Chemical Company (Lindsay Light) previously occupied facilities in the Streeterville area from approximately 1904 through the mid-1930s (316 E. Illinois, 161 E. Grand Avenue, and 22 W. Hubbard), and elevated levels of radiation have been identified on properties in the vicinity, as a result of the associated use and storage of thorium-impacted ore (tailings) in the production of gas mantles by Lindsay. Although reasonably ascertainable information documented in a *Letter Report Update of Phase I Environmental Site Assessment of Parcel 24*, dated September 30, 2003, and prepared by URS Corporation, indicates that the subject property was never occupied by a Lindsay Light facility and there have been no historical operations using thorium at the subject property, further investigation was required to determine whether or not radioactive thorium was present. In addition, the testing was performed to satisfy the requirements of the US EPA and the City of Chicago, who have developed procedures for subsurface work in this area of the City given the potential for radioactive thorium-impacted soil to have been disposed of, or used as "fill", on sites throughout the area during this time, and in an effort to ensure the proper management of any impacted soils identified.

Pioneer was previously engaged by River East P24, LLC (client) to perform soil sampling and analytical testing in connection with the establishment of temporary electrical service at the subject property. Testing was requested by US EPA in connection with a permit application submitted to the City of Chicago for the utility work. The purpose was to determine if soils excavated during utility excavation had been impacted by radioactive thorium. The testing was specifically performed to meet the requirements of the City permit, in accordance with US EPA guidance.

The results of Pioneer's initial investigation indicated that soils were not impacted in the three test pit areas excavated on-site, as summarized in an October 12, 2007, letter from RSSI, which was previously provided to US EPA and City of Chicago prior to issuance of the permit. The results of this initial investigation were

consistent with the results of a prior walkover gamma radiation survey conducted at the site in 2000. The results of the walkover survey were previously included in a report presented to US EPA, entitled *Radiation Survey of Three Parking Lots in the Vicinity of the Former Kraft Building*, dated November 20, 2000, and prepared by STS Consultants Ltd. The report summarized surveying activities conducted on three lots (Parcel 4, Parcel 21, and Parcel 24), and indicated that there were no indications of impacts evident on Parcel 24 (the current subject property), although potential impacts were detected on Parcel 21 during the walkover survey, and later confirmed on the Kraft Building Parking Lot.

After reviewing the testing results, the US EPA requested that the property enter into an Administrative Order as a protective measure prior to proceeding with site work. However, given that there have been no indications of potential thorium impacts identified at the site, Pioneer proposed a scope of work to complete additional subsurface investigation and coordinate between the US EPA and RSSI on behalf of the client, in an effort to satisfy US EPA's concerns.

### **Site Activities**

As mentioned, given that the results of the prior radiation surveys indicated that there were no significant anomalies in the soils on-site, Pioneer developed a scope of work to obtain additional data on a generalized grid throughout the subject property. Pioneer subcontracted RSSI, a radiation specialist with certified health physicists and associated personnel, to provide on-site supervision of the testing activities, and to analyze soil samples at their discretion based on field indications of possible radioactivity in down hole screening at the site.

Pioneer assisted RSSI in the collection of soil samples from the subject property. The soil sampling activities were performed for the purpose of collecting downhole radiation screening results, and to collect soil samples for gamma spectroscopy analysis. The original scope of subsurface sampling was performed on August 11, 2008. Two additional borings were completed along the western property boundary adjacent to North Peshtigo Court on August 12, 2008, given the known presence of thorium impacts on the property located west of Peshtigo Court (the Kraft Building Parking Lot), and 10 additional soil borings were completed on the northwestern portion of the site on October 14, 2008, due to the results from the first phase of investigation which suggested that elevated readings may be present in the area of B-8, B-11, and B-12 (see attached figure).

The soil testing activities were performed in general conformance with the sampling procedures outlined in the June 11, 2008, *Soil Testing Services Proposal* prepared by Pioneer and provided to US EPA in advance of the testing activities, with the following noted exception: Soil sampling was completed with a conventional rotary drill rig and split spoon sampling techniques, rather than Geoprobe equipment and direct-push methodology, to eliminate the need for the second drilling unit. Since there were no prior elevated radiation readings, sampling locations (B-1 through B-12) were initially chosen in accessible areas in order to provide general coverage across the entire site, in order to confirm that the soil anticipated to be disturbed during future construction activities does not contain elevated levels of radioactive thorium. Subsequent testing (B-13 through B-22) was performed in a generalized grid in the northwestern portion of the site across areas where the highest readings were detected.

Soil samples were collected continuously across the desired sampling intervals utilizing a conventional rotary drill rig (Ingersoll Rand™ 300B) and split spoon sampling techniques, in accordance with American Society of Testing and Materials (ASTM) standards (ASTM: D 1586). A photographic log of the sampling activities is included for review as an attachment to this report. Soil samples were retrieved from each boring, and logged according to the predominant geologic materials encountered. The samples from each interval were

placed on clean, 50-mil plastic to await the results of the downhole screening. As a note, silty, sandy, and gravelly urban fill materials consisting of rubble, concrete, brick fragments, glass, and miscellaneous debris were consistently encountered in the subsurface across the site. Boring logs indicating the geologic conditions encountered during sampling activities at each of the soil borings are included as attachments to this report. The fill encountered immediately below the asphalt surface cover and gravel base course and extending to depths ranging from approximately 2'-5' below surface grade (BSG) consisted of a silty clay with gravel and some miscellaneous debris. Below depths of approximately 2'-5' BSG, the fill material consisted predominantly of a poorly sorted, coarse silty sand with gravel and miscellaneous debris.

The soil borings were advanced to a maximum depth interval corresponding with the apparent presence of groundwater, given that downhole screening could not be performed below this depth. The apparent depth of groundwater ranged from approximately 6'-10' below surface grade (BSG) in the soil borings advanced at the site. Upon encountering groundwater, the augers were removed from the borehole, and a (approximately) 10-foot section of 3-inch, schedule 40 PVC pipe was inserted into the borehole to serve as a conduit for the down hole screening device.

The downhole radiation screening was performed by RSSI (see attached report), with readings collected for one minute counts at one foot intervals using a 2-inch diameter, Ludlum Model 2200 scaler ratemeter equipped with a Ludlum model 44-10 (Model 44-10) 2 inch by 2 inch NaI (Tl) scintillation detector. Once the entire vertical length of the boring had been screened by RSSI personnel, the screening device was extracted from the borehole and Pioneer personnel assisted the RSSI personnel with the selection of samples from the intervals which displayed the highest downhole instrument response for laboratory testing. The samples selected for laboratory testing were analyzed by gamma spectroscopy for one-hour counts to determine the presence of radioactive radium 226 (Ra-226) plus Ra-228, based on the amount of lead 214 plus actinium 228 in samples collected across the sampling grid. Ten additional samples were collected from the northwestern portion of the site to further assess the areas surrounding B-8, B-11, and B-12. The results of the laboratory analyses are summarized in the following table. The sampling locations are depicted in the attached Figure 1.

As outlined in the attached RSSI report, entitled *Subsurface Radiation Measurements at 515 North Peshtigo Court*, and dated December 16, 2008, there is not a significant presence of either of the primary indicator elements for thorium (radium and actinium) in any of the samples analyzed, as summarized below. A 30-day recount was performed on one sample (B-8), given the initial reading (4.7 pCi/L), but the results of the recount (5.0 pCi/L) were also below the 7.1 pCi/L action level. Thus, Pioneer believes there is no evidence of radioactivity associated with the targeted thorium series above the US EPA action level of 7.1 pCi/g in the areas investigated, and the detected concentrations are typical of those found in normal soils and urban fill/debris.

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**Table A - Downhole Screening & Gamma Spectroscopy Results**  
**515 N. Peshtigo Ct. (Parcel 24)**

Location/Depth	B-1	B-2	B-3	B-4	B-5	B-6
0'	3,996	4,919	3,399	4,319	3,739	4,951
1'	10,800	7,904	4,447	5,011	3,256	5,312
2'	10,783	15,216	8,269	16,571	8,883	14,493
3'	9,402	14,781	14,911	14,015	15,510	15,156
4'	12,643	9,629	17,132	--	14,515	15,238
5'	11,996	11,678	14,856	--	14,196	14,385
6'	10,760	9,846	10,013	--	11,694	13,746
7'	10,114	7,930	9,749	--	11,288	12,696
8'	10,487	8,587	9,128	--	--	11,349
9'	--	12,023	7,872	--	--	9,306
10'	--	--	5,298	--	--	--
<b>Gamma Spec. (total pCi/g)</b>	1.4	2.8	2.0	--	2.2	2.4

Location/Depth	B-7	B-8	B-9	B-10	B-11	B-12
0'	4,002	4,219	4,007	4,098	3,730	3,914
1'	4,090	4,137	3,841	8,416	5,187	8,890
2'	10,646	9,929	11,375	15,671	11,571	17,222
3'	12,157	13,471	14,513	15,947	22,282	22,367
4'	11,045	21,578	11,531	15,488	19,745	20,108
5'	12,238	18,551	11,718	12,550	16,685	18,093
6'	11,293	13,015	14,302	12,019	12,611	16,327
7'	11,531	11,030	14,160	10,572	14,447	12,613
8'	9,960	11,132	12,976	--	16,115	8,073
9'	6,642	8,856	10,742	--	15,663	--
10'	--	--	--	--	--	--
<b>Gamma Spec. (total pCi/g)</b>	--	4.7.5.0*	2.7	2.7	2.1	2.3

Location/Depth	B-13	B-14	B-15	B-16	B-17
0'	4,917	4,976	4,851	4,918	9,477
1'	6,900	5,142	6,145	10,201	8,039
2'	20,561	14,313	9,564	19,666	21,072
3'	20,968	15,637	10,052	22,498	17,970
4'	22,015	20,338	14,059	20,074	17,625
5'	18,181	19,777	19,706	23,172	31,615
6'	19,676	20,100	17,181	21,268	27,117
7'	18,539	20,424	14,895	14,115	18,217
8'	18,783	16,389	15,112	12,142	14,252
9'	--	--	--	--	--
10'	--	--	--	--	--
<b>Gamma Spec. (total pCi/g)</b>	2.45	1.9	2.0	3.4	3.79

**Table A (continued) - Downhole Screening & Gamma Spectroscopy Results  
 515 N. Peshtigo Ct. (Parcel 24)**

Location/Depth	B-18	B-19	B-20	B-21	B-22
0'	6,165	6,595	9,036	5,197	4,386
1'	18,427	16,727	19,084	13,663	10,052
2'	<b>29,085</b>	12,884	<b>20,185</b>	<b>12,710</b>	18,417
3'	30,975	12,078	<b>19,355</b>	<b>16,748</b>	19,069
4'	<b>28,652</b>	14,881	<b>15,388</b>	<b>17,398</b>	23,180
5'	22,505	<b>20,184</b>	16,313	18,057	22,344
6'	20,450	<b>17,688</b>	15,669	14,877	15,925
7'	21,234	18,573	20,340	10,222	14,672
8'	18,538	13,171	19,129	8,694	10,642
9'	--	--	--	--	--
10'	--	--	--	--	--
<b>Gamma Spec.          (total pCi/g)</b>	3.52	2.01	2.26	1.2	3.1

Notes: On-site background = 2,969 counts per minute (cpm) for downhole screening.

-- = No sample analyzed.

Intervals in **Bold/Shaded** selected for analysis.

Background Ra-226 + Ra-228 in Streeterville established by US EPA at 2.1 pCi/g.

Action level for Ra-226 + Ra-228 in Streeterville established by US EPA at 7.1 pCi/g.

\* = 30-day recount

### **Conclusions**

Based on the cumulative assessment work completed at the site, including the walkover survey, test pit excavations, and soil borings, Pioneer believes it can be reasonably ascertained that radioactive thorium does not have a significant presence on-site. Although initial testing performed in the area of B-8, B-11, and B-12 suggested the potential presence of elevated radiation levels in this area, additional soil borings advanced on the northwestern portion of the site did not identify elevated thorium levels in the samples analyzed. As such, the site does not appear to have been impacted by nearby operations involving radioactive thorium, and Pioneer believes that an Administrative Order should not be required for the planned redevelopment of the site. As a conservative and proactive measure, Pioneer recommends that the client employs a certified radiation specialist to provide on-site screening during subsurface work anticipated during the redevelopment as a voluntary worker safety precaution.

### **Closing Remarks**

This report has been prepared for the sole use of the client identified in the report, and for evaluation by US EPA, and can not be relied upon by other persons or entities without the joint permission of the client and Pioneer Engineering & Environmental Services, Inc. (Pioneer). The observations and conclusions contained herein are limited by the scope and intent of the work mutually agreed upon by the client and Pioneer and the work actually performed. There are no warranties, implied or expressed, concerning the environmental integrity of areas and/or mediums not analytically tested.

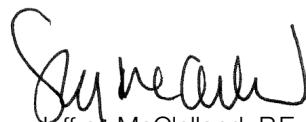
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Pioneer appreciates the opportunity to be of service to you on this project. We hope this information meets your needs at this time. If you have any questions regarding this assessment, please contact us at (773) 722-9200.

Respectfully Submitted,  
*Pioneer Environmental Services, LLC*



Joseph C. Kelly, P.G.  
Senior Project Manager



Jeffrey McClelland, P.E.  
Vice President

**Figure**

Site Diagram

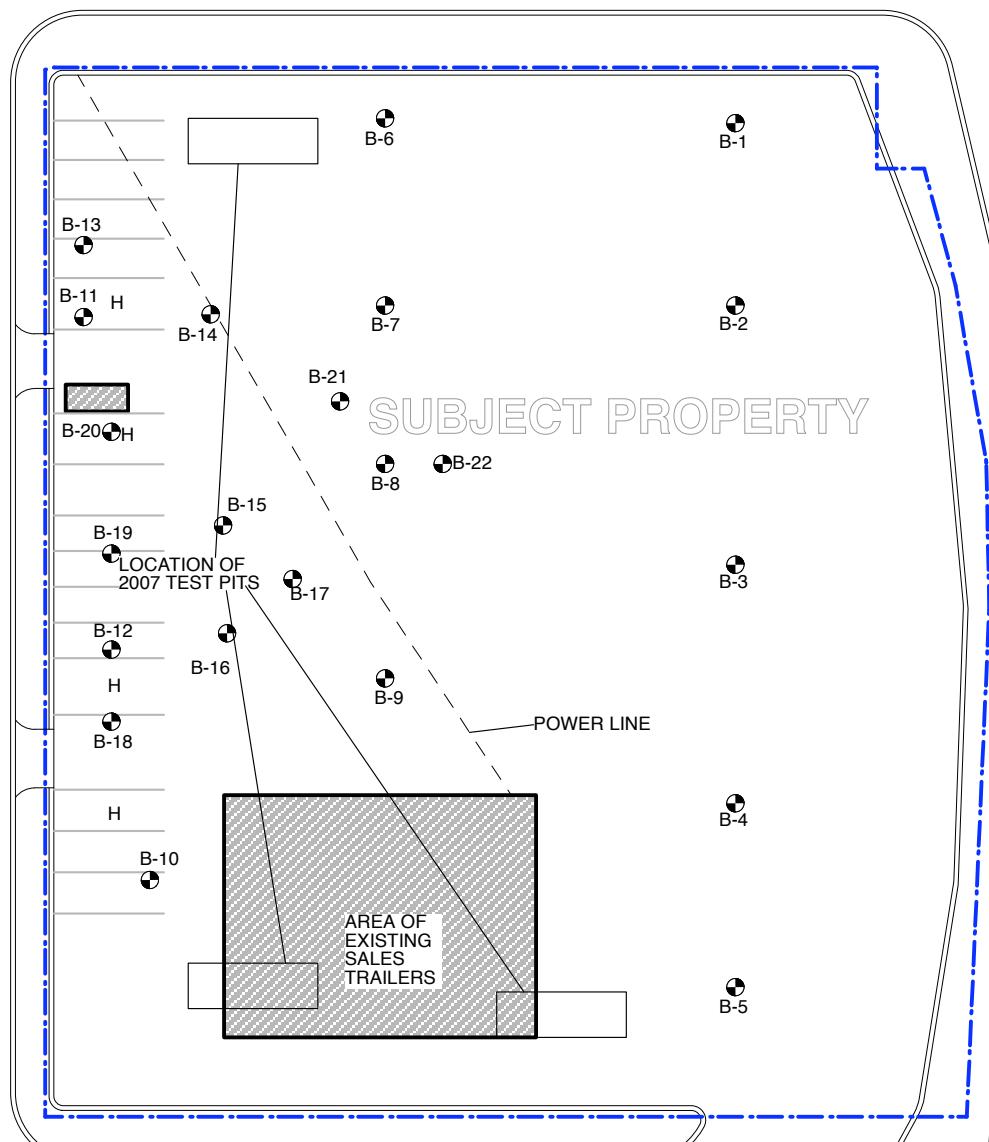
North



### EAST GRAND AVENUE

NORTH PESHTIGO COURT

NORTH LAKE SHORE DRIVE



EAST ILLINOIS STREET

## **Appendix A**

### Photographic Log



View of subject property and sampling areas



Soil sampling activities at B-3



Representative soil samples



Conducting downhole screening

<b>PIONEER</b> ENVIRONMENTAL SERVICES, LLC	515 Peshtigo Ct. Chicago, Illinois	<b>PHOTOGRAPHIC LOG</b>
	Project Number: 07-1550	DATE: 2008

## **Appendix B**

### Soil Boring Logs



## Boring Log

Boring No.: B-1

Site:

515. N. Peshtigo  
Chicago, IL

Date Begin: 8/11/08

Date End: 8/11/08

PID (ppm)	Sample Recovery	Sample	Depth Feet	Soil Class	Lithology	Description	Remarks
-	50			Asphalt		ASPHALT Surface	
-	75			GM		GRAVEL Base	No Odor, No Visual
-	75		4	Fill		Urban FILL, crushed cinders, bricks, concrete w/ loose gravel, silt, sand & brown/gray clay, moist	No Odor, No Visual
-	75						No Odor, No Visual
-	75		8			Boring Terminated at 8Ft.	No Odor, No Visual

Completion Notes:

Hatched Pattern Indicates Sample Analyzed.

Drill Rig: IRA Drill Rig

Driller: Vine/ Jesus

Geologist: J. Mizwicki

LUST Incident No:

Water Depth While Drilling: 6

Water Depth After Drilling:

Project Number: 07-1550-103

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## Boring Log

Boring No.: B-2

Site:

515. N. Peshtigo  
Chicago, Il

Date Begin: 8/11/08

Date End: 8/11/08

PID (ppm)	Sample Recovery	Sample	Depth Feet	Soil Class	Lithology	Description	Remarks
-	50			Asphalt		ASPHALT Surface	
-	75			GM		GRAVEL Base	No Odor, No Visual
-	50		4	Fill		Urban FILL, crushed cinders, bricks, concrete w/ loose gravel, silt, sand & clay, moist	No Odor, No Visual
-	75		8			Boring Terminated at 9 Ft.	No Odor, No Visual

Completion Notes:

Hatched Pattern Indicates Sample Analyzed.

Drill Rig: IRA Drill Rig

Driller: Vine/ Jesus

Geologist: J. Mizwicki

LUST Incident No:

Water Depth While Drilling: 5

Water Depth After Drilling:

Project Number: 07-1550-103

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## Boring Log

Boring No.: B-3

Site:

515. N. Peshtigo  
Chicago, IL

Date Begin: 8/11/08

Date End: 8/11/08

PID (ppm)	Sample Recovery	Sample	Depth Feet	Soil Class	Lithology	Description	Remarks
-	50			Asphalt		ASPHALT Surface	
-	75			GM		GRAVEL Base	No Odor, No Visual
-	50		4			Urban FILL, crushed cinders, bricks, concrete w/ loose gravel, silt, sand & brown/gray clay, moist	No Odor, No Visual
-	75		8				No Odor, No Visual
-	50			Fill			No Odor, No Visual
						Boring Terminated at 10 Ft.	

Completion Notes:

Hatched Pattern Indicates Sample Analyzed.

Drill Rig: IRA Drill Rig

Driller: Vine/ Jesus

Geologist: J. Mizwicki

LUST Incident No:

Water Depth While Drilling: 6

Water Depth After Drilling:

Project Number: 07-1550-103

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## Boring Log

Boring No.: B-4

Site:

515. N. Peshtigo  
Chicago, IL

Date Begin: 8/11/08

Date End: 8/11/08

PID (ppm)	Sample Recovery	Sample	Depth Feet	Soil Class	Lithology	Description	Remarks
-	50			Asphalt		ASPHALT Surface	
-	25			GM		GRAVEL Base	No Odor, No Visual
			4	Fill		Urban FILL, crushed cinders, bricks, concrete w/ loose gravel, silt, sand & brown/gray clay, moist	No Odor, No Visual
			8			Refusal Encountered at 3 Ft.	

Completion Notes:

Hatched Pattern Indicates Sample Analyzed.

Drill Rig: IRA Drill Rig

Driller: Vine/ Jesus

Geologist: J. Mizwicki

LUST Incident No:

Water Depth While Drilling:

Water Depth After Drilling:

Project Number: 07-1550-103

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## Boring Log

Boring No.: B-5

Site:

515. N. Peshtigo  
Chicago, IL

Date Begin: 8/11/08

Date End: 8/11/08

PID (ppm)	Sample Recovery	Sample	Depth Feet	Soil Class	Lithology	Description	Remarks
-	50			Asphalt		ASPHALT Surface	
-	75			GM		GRAVEL Base	No Odor, No Visual
-	50		4	Fill		Urban FILL, crushed cinders, bricks, concrete w/ loose gravel, silt, sand & brown/gray clay, moist	No Odor, No Visual
-	50		8			Boring Terminated at 7 Ft.	No Odor, No Visual

Completion Notes:

Hatched Pattern Indicates Sample Analyzed.

Drill Rig: IRA Drill Rig

Driller: Vine/ Jesus

Geologist: J. Mizwicki

LUST Incident No:

Water Depth While Drilling: 6

Water Depth After Drilling:

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## Boring Log

Boring No.: B-6

Site:

515. N. Peshtigo  
Chicago, IL

Date Begin: 8/11/08

Date End: 8/11/08

PID (ppm)	Sample Recovery	Sample	Depth Feet	Soil Class	Lithology	Description	Remarks
-	50			Asphalt		ASPHALT Surface	
-	75			GM		GRAVEL Base	No Odor, No Visual
-	75		4			Urban FILL, crushed cinders, bricks, concrete w/ loose gravel, silt, sand & brown/gray clay, moist	No Odor, No Visual
-	75			Fill			No Odor, No Visual
-	75		8				No Odor, No Visual
						Boring Terminated at 9 Ft.	

Completion Notes:

Hatched Pattern Indicates Sample Analyzed.

Drill Rig: IRA Drill Rig

Driller: Vine/ Jesus

Geologist: J. Mizwicki

LUST Incident No:

Water Depth While Drilling: 6

Water Depth After Drilling:

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## Boring Log

Boring No.: B-7

Site:

515. N. Peshtigo  
Chicago, IL

Date Begin: 8/11/08

Date End: 8/11/08

PID (ppm)	Sample Recovery	Sample	Depth Feet	Soil Class	Lithology	Description	Remarks
-	50			Asphalt		ASPHALT Surface	No Odor, No Visual
-	50			GM		GRAVEL Base	
-	75		4	Fill		Urban FILL, crushed cinders, bricks, concrete w/ loose gravel, silt, sand & brown/gray clay, moist	
-	75		8			Boring Terminated at 9 Ft.	

Completion Notes:

Hatched Pattern Indicates Sample Analyzed.

Drill Rig: IRA Drill Rig

Driller: Vine/ Jesus

Geologist: J. Mizwicki

LUST Incident No:

Water Depth While Drilling: 6

Water Depth After Drilling:

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## Boring Log

Boring No.: B-8

Site:

515. N. Peshtigo  
Chicago, IL

Date Begin: 8/11/08

Date End: 8/11/08

PID (ppm)	Sample Recovery	Sample	Depth Feet	Soil Class	Lithology	Description	Remarks
-	50			Asphalt		ASPHALT Surface	
-	75			GM		GRAVEL Base	No Odor, No Visual
-	75		4	Fill		Urban FILL, crushed cinders, bricks, concrete w/ loose gravel, silt, sand & brown/gray clay, moist	No Odor, No Visual
-	50		8				No Odor, No Visual
						Boring Terminated at 9 Ft.	

Completion Notes:

Hatched Pattern Indicates Sample Analyzed.

Drill Rig: IRA Drill Rig

Driller: Vine/ Jesus

Geologist: J. Mizwicki

LUST Incident No:

Water Depth While Drilling: 6

Water Depth After Drilling:

Project Number: 07-1550-103

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## Boring Log

Boring No.: B-9

Site:

515. N. Peshtigo  
Chicago, IL

Date Begin: 8/11/08

Date End: 8/11/08

PID (ppm)	Sample Recovery	Sample	Depth Feet	Soil Class	Lithology	Description	Remarks
-	50			Asphalt		ASPHALT Surface	
-	50			GM		GRAVEL Base	No Odor, No Visual
-	50		4			Urban FILL, crushed cinders, bricks, concrete w/ loose gravel, silt, sand & brown/gray clay, moist	No Odor, No Visual
-	75			Fill			No Odor, No Visual
-	75						No Odor, No Visual
-	50		8				No Odor, No Visual
						Boring Terminated at 9 Ft.	

Completion Notes:

Hatched Pattern Indicates Sample Analyzed.

Drill Rig: IRA Drill Rig

Driller: Vine/ Jesus

Geologist: J. Mizwicki

LUST Incident No:

Water Depth While Drilling: 6

Water Depth After Drilling:

Project Number: 07-1550-103

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## Boring Log

Boring No.: B-10

Site:

515. N. Peshtigo  
Chicago, IL

Date Begin: 8/11/08

Date End: 8/11/08

PID (ppm)	Sample Recovery	Sample	Depth Feet	Soil Class	Lithology	Description	Remarks
-	50			Asphalt		ASPHALT Surface	
-	75			GM		GRAVEL Base	No Odor, No Visual
-	50		4	Fill		Urban FILL, crushed cinders, bricks, concrete w/ loose gravel, silt, sand & brown/gray clay, moist	No Odor, No Visual
			8			Boring Terminated at 7 Ft.	No Odor, No Visual

Completion Notes:

Hatched Pattern Indicates Sample Analyzed.

Drill Rig: IRA Drill Rig

Driller: Vine/ Jesus

Geologist: J. Mizwicki

LUST Incident No:

Water Depth While Drilling: 6

Water Depth After Drilling:

Project Number: 07-1550-103

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## Boring Log

Boring No.: B-11

Site:

515. N. Peshtigo  
Chicago, Il

Date Begin: 8/12/08

Date End: 8/12/08

PID (ppm)	Sample Recovery	Sample	Depth Feet	Soil Class	Lithology	Description	Remarks
-	50			Asphalt		ASPHALT Surface	No Odor, No Visual
-	75			GM		GRAVEL Base	
-	50		4	Fill		Urban FILL, crushed cinders, bricks, concrete w/ loose gravel, silt, sand & clay, moist	
-	75		8			Boring Terminated at 9 Ft.	

Completion Notes:

Hatched Pattern Indicates Sample Analyzed.

Drill Rig: IRA Drill Rig

Driller: Vine/ Jesus

Geologist: J. Mizwicki

LUST Incident No:

Water Depth While Drilling: 6

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## Boring Log

Boring No.: B-12

Site:

515. N. Peshtigo  
Chicago, IL

Date Begin: 8/12/08

Date End: 8/12/08

PID (ppm)	Sample Recovery	Sample	Depth Feet	Soil Class	Lithology	Description	Remarks
-	50			Asphalt		ASPHALT Surface	
-	75			GM		GRAVEL Base	No Odor, No Visual
-	50		4	Fill		Urban FILL, crushed cinders, bricks, concrete w/ loose gravel, silt, sand & brown/gray clay, moist	No Odor, No Visual
-	75		8			Boring Terminated at 8 Ft.	No Odor, No Visual

Completion Notes:

Hatched Pattern Indicates Sample Analyzed.

Drill Rig: IRA Drill Rig

Driller: Vine/ Jesus

Geologist: J. Mizwicki

LUST Incident No:

Water Depth While Drilling: 6

Water Depth After Drilling:

Project Number: 07-1550-103

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## Boring Log

Boring No.: B-13

Site:

515 N. Peshtigo CT.  
Chicago, IL

Date Begin: 10/14/08

Date End: 10/14/08

PID (ppm)	Sample Recovery	Sample	Depth Feet	Soil Class	Lithology	Description	Remarks
0	50%			Asphalt		ASPHALT	
0	75%			GM		GRAVEL Base, large subangular rocks & sand Urban FILL, loose gravel, silt, sand, black/brown clay, crushed brick	No Odor, No Visual
0	75%		4	Fill			No Odor, No Visual
0	75%						No Odor, No Visual
0	75%		8			Boring Terminated at 8 Ft.	
Completion Notes: Hatched Pattern Indicates Sample Analyzed.					Drill Rig:	IRA Drill Rig	
					Driller:	Vine/Jesus	
					Geologist:	J. Mizwicki	
					LUST Incident No:		
Water Depth While Drilling: 7			Water Depth After Drilling:		Project Number: 07-1550-104	Page	1



## Boring Log

Boring No.: B-14

Site:

515 N. Peshtigo CT.  
Chicago, IL

Date Begin: 10/14/08

Date End: 10/14/08

PID (ppm)	Sample Recovery	Sample	Depth Feet	Soil Class	Lithology	Description	Remarks
0	50%			Asphalt		ASPHALT	
0	75%			GM		GRAVEL Base, large subangular rocks & sand Urban FILL, loose gravel, silt, sand, black/brown clay, crushed brick	No Odor, No Visual
0	75%		4	Fill			No Odor, No Visual
0	75%						No Odor, No Visual
0	75%		8			Boring Terminated at 8 Ft.	

Completion Notes:

Hatched Pattern Indicates Sample Analyzed.

Drill Rig: IRA Drill Rig

Driller: Vine/Jesus

Geologist: J. Mizwicki

LUST Incident No:

Water Depth While Drilling: 7

Water Depth After Drilling:

Project Number: 07-1550-104

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## Boring Log

Boring No.: B-15

Site:

515 N. Peshtigo CT.  
Chicago, IL

Date Begin: 10/14/08

Date End: 10/14/08

PID (ppm)	Sample Recovery	Sample	Depth Feet	Soil Class	Lithology	Description	Remarks
0	50%			Asphalt		ASPHALT	
0	75%			GM		GRAVEL Base, large subangular rocks & sand Urban FILL, loose gravel, silt, sand, black/brown clay, crushed brick	No Odor, No Visual
0	75%		4	Fill			No Odor, No Visual
0	75%						No Odor, No Visual
0	75%		8			Boring Terminated at 8 Ft.	

Completion Notes:

Hatched Pattern Indicates Sample Analyzed.

Drill Rig: IRA Drill Rig

Driller: Vine/Jesus

Geologist: J. Mizwicki

LUST Incident No:

Water Depth While Drilling: 7

Water Depth After Drilling:

Project Number: 07-1550-104

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## Boring Log

Boring No.: B-16

Site:

515 N. Peshtigo CT.  
Chicago, IL

Date Begin: 10/14/08

Date End: 10/14/08

PID (ppm)	Sample Recovery	Sample	Depth Feet	Soil Class	Lithology	Description	Remarks
0	50%			Asphalt		ASPHALT	
0	75%			GM		GRAVEL Base, large subangular rocks & sand Urban FILL, loose gravel, silt, sand, black/brown clay, crushed brick	No Odor, No Visual
0	75%		4	Fill			No Odor, No Visual
0	75%						No Odor, No Visual
0	75%		8			Boring Terminated at 8 Ft.	

Completion Notes:

Hatched Pattern Indicates Sample Analyzed.

Drill Rig: IRA Drill Rig

Driller: Vine/Jesus

Geologist: J. Mizwicki

LUST Incident No:

Water Depth While Drilling: 7

Water Depth After Drilling:

Project Number: 07-1550-104

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## Boring Log

Boring No.: B-17

Site:

515 N. Peshtigo CT.  
Chicago, IL

Date Begin: 10/14/08

Date End: 10/14/08

PID (ppm)	Sample Recovery	Sample	Depth Feet	Soil Class	Lithology	Description	Remarks
0	50%			Asphalt		ASPHALT	
0	75%			GM		GRAVEL Base, large subangular rocks & sand Urban FILL, loose gravel, silt, sand, black/brown clay, crushed brick	No Odor, No Visual
0	75%		4	Fill			No Odor, No Visual
0	75%						No Odor, No Visual
0	75%		8			Boring Terminated at 8 Ft.	

Completion Notes:

Hatched Pattern Indicates Sample Analyzed.

Drill Rig: IRA Drill Rig

Driller: Vine/Jesus

Geologist: J. Mizwicki

LUST Incident No:

Water Depth While Drilling: 7

Water Depth After Drilling:

Project Number: 07-1550-104

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## Boring Log

Boring No.: B-18

Site:

515 N. Peshtigo CT.  
Chicago, IL

Date Begin: 10/14/08

Date End: 10/14/08

PID (ppm)	Sample Recovery	Sample	Depth Feet	Soil Class	Lithology	Description	Remarks
0	50%			Asphalt		ASPHALT	
0	75%			GM		GRAVEL Base, large subangular rocks & sand Urban FILL, loose gravel, silt, sand, black/brown clay, crushed brick	No Odor, No Visual
0	75%		4	Fill			No Odor, No Visual
0	75%						No Odor, No Visual
0	75%		8			Boring Terminated at 8 Ft.	

Completion Notes:

Hatched Pattern Indicates Sample Analyzed.

Drill Rig: IRA Drill Rig

Driller: Vine/Jesus

Geologist: J. Mizwicki

LUST Incident No:

Water Depth While Drilling: 7

Water Depth After Drilling:

Project Number: 07-1550-104

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## Boring Log

Boring No.: B-19

Site:

515 N. Peshtigo CT.  
Chicago, IL

Date Begin: 10/14/08

Date End: 10/14/08

PID (ppm)	Sample Recovery	Sample	Depth Feet	Soil Class	Lithology	Description	Remarks
0	25%			Asphalt		ASPHALT	
0	50%			GM		GRAVEL Base, large subangular rocks & sand Urban FILL, loose gravel, silt, sand, black/brown clay, crushed brick	No Odor, No Visual
0	50%		4	Fill			No Odor, No Visual
0	75%		8			Boring Terminated at 8 Ft.	No Odor, No Visual

Completion Notes:

Hatched Pattern Indicates Sample Analyzed.

Drill Rig: IRA Drill Rig

Driller: Vine/Jesus

Geologist: J. Mizwicki

LUST Incident No:

Water Depth While Drilling: 7

Water Depth After Drilling:

Project Number: 07-1550-104

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## Boring Log

Boring No.: B-20

Site:

515 N. Peshtigo CT.  
Chicago, IL

Date Begin:

Date End:

PID (ppm)	Sample Recovery	Sample	Depth Feet	Soil Class	Lithology	Description	Remarks
0	25%			Asphalt		ASPHALT	
0	50%			GM		GRAVEL Base, large subangular rocks & sand Urban FILL, loose gravel, silt, sand, black/brown clay, crushed brick	No Odor, No Visual
0	50%		4	Fill			No Odor, No Visual
0	75%		8			Boring Terminated at 8 Ft.	No Odor, No Visual

Completion Notes:

Hatched Pattern Indicates Sample Analyzed.

Drill Rig:

IRA Drill Rig

Driller:

Vine/Jesus

Geologist:

J. Mizwicki

LUST Incident No:

Water Depth While Drilling: 7

Water Depth After Drilling:

Project Number: 07-1550-104

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## Boring Log

Boring No.: B-21

Site:

515 N. Peshtigo CT.  
Chicago, IL

Date Begin: 10/14/08

Date End: 10/14/08

PID (ppm)	Sample Recovery	Sample	Depth Feet	Soil Class	Lithology	Description	Remarks
0	25%			Asphalt		ASPHALT	
0	50%			GM		GRAVEL Base, large subangular rocks & sand	No Odor, No Visual
0	50%		4	Concrete		CONCRETE Layer	No Odor, No Visual
0	50%			Fill		Urban FILL, loose gravel, silt, sand, black/brown clay, crushed brick	No Odor, No Visual
0	50%		8			Boring Terminated at 8 Ft.	No Odor, No Visual
Completion Notes: Hatched Pattern Indicates Sample Analyzed.					Drill Rig:	IRA Drill Rig	
					Driller:	Vine/Jesus	
					Geologist:	J. Mizwicki	
					LUST Incident No:		
Water Depth While Drilling: 7			Water Depth After Drilling:		Project Number: 07-1550-104	Page	1



## Boring Log

Boring No.: B-22

Site:

515 N. Peshtigo CT.  
Chicago, IL

Date Begin: 10/14/08

Date End: 10/14/08

PID (ppm)	Sample Recovery	Sample	Depth Feet	Soil Class	Lithology	Description	Remarks
0	50%			Asphalt		ASPHALT	
0	75%			GM		GRAVEL Base, large subangular rocks & sand Urban FILL, loose gravel, silt, sand, black/brown clay, crushed brick & cinders	No Odor, No Visual
0	75%		4	Fill			No Odor, No Visual
0	75%						No Odor, No Visual
0	75%		8			Boring Terminated at 8 Ft.	

Completion Notes:

Hatched Pattern Indicates Sample Analyzed.

Drill Rig: IRA Drill Rig

Driller: Vine/Jesus

Geologist: J. Mizwicki

LUST Incident No:

Water Depth While Drilling: 7

Water Depth After Drilling:

Project Number: 07-1550-104

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## **Appendix C**

Downhole Survey Report

SUBSURFACE RADIATION MEASUREMENTS  
AT 515 NORTH PESHTIGO COURT  
CHICAGO, ILLINOIS  
PERFORMED ON  
AUGUST 11 - 12, 2008  
AND  
OCTOBER 14, 2008

FOR

PIONEER ENGINEERING & ENVIRONMENTAL SERVICES, INC.  
700 NORTH SACRAMENTO BLVD, SUITE 101  
CHICAGO, ILLINOIS

BY

**RSSI**  
6312 W. OAKTON STREET  
MORTON GROVE, ILLINOIS

December 23, 2008

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## I. INTRODUCTION

In the early 1900s, Lindsay Light and Chemical Company refined and used thorium in industrial operations between Illinois Street and Grand Avenue east of Michigan Avenue, in Chicago's Streeterville area. Thorium is naturally radioactive. The predominate isotope of thorium, thorium-232 (Th-232), decays to radium-228 (Ra-228). Another isotope, thorium-230 (Th-230), decays to radium-226 (Ra-226).

The US Environmental Protection Agency (EPA) reported that the material from Lindsay Light and Chemical Company refining operations may have been in fill used throughout the Streeterville area. The property at 515 North Peshtigo Court, Chicago, Illinois is located in Streeterville and was assessed to address this concern. The EPA has set a standard of 5 picocuries per gram (pCi/g) of Ra-226 plus Ra-228 above background concentrations. Background concentrations in the Streeterville area are assumed by the EPA to be 2.1 pCi/g of combined Ra-226 and Ra-228 resulting in an action level of 7.1 pCi/g combined Ra-226 and Ra-228.

## II. METHODOLOGY

### Borehole Radiation Level Measurements

On August 11 - 12, 2008, borehole radiation levels were measured at twelve locations selected by Pioneer. On October 14, 2008, radiation levels were measured in ten additional boreholes. Borehole locations are in Appendix A. Borehole measurements were performed using a Ludlum Model 2200 scaler ratemeter equipped with a Ludlum model 44-10 (Model 44-10) scintillation detector. No shielding was used for down-hole measurements to maximize the response to photons from all directions. Borehole measurement results are in Appendix B.

The Ludlum Model 2200 is a scaler, ratemeter and Single Channel Analyzer with a timer and adjustable high voltage, threshold and window. It is used with a Ludlum Model 44-10 scintillation detector. The Model 44-10 is a thallium doped sodium iodide ( $\text{NaI}(\text{Tl})$ ) gamma scintillator coupled to photomultiplier tube (PMT). Gamma scintillation detectors are sensitive to photons

and are used to identify and quantify gamma emitting radionuclides.

The instrument was calibrated in simulated boreholes with a known concentration of thorium from the uranium and thorium series in monazite sands. The radionuclides in the series are in equilibrium with their daughters which include Ra-226 and Ra-228. The instrument response was approximately 2,300 cpm per pCi/g of Ra-226 and Ra-228 in an extended homogenous source. An instrument response of 11,500 cpm above background (See Section III) corresponds to approximately 5 pCi/g.

### Soil Analysis

Ten soil samples were collected on August 11 - 12, 2008, in 500 ml Marinelli containers from the boreholes at the depth of the maximum radiation level in each borehole. The scope of the work limited initial sample collection to soil from 10 boreholes. No samples were collected from two boreholes, BH-4 and BH-7. Borehole BH-4 was only 3 feet in depth and did not produce enough soil for a sample. No significant elevated radiation levels were measured in borehole BH-7. Samples were collected on October 14, 2008, from ten additional boreholes at the depth of the maximum radiation level in each borehole. Samples were counted for one hour on an Ortec DART high-resolution gamma spectroscopy system. The client requested recounting the sample collected from BH-8, because the initial concentration of radium surrogates, 4.7 pCi/g, had potential to increase to over 7.1 pCi/g after ingrowth of radon daughters.

The DART gamma spectrometer is an 8k channel, multichannel analyzer (MCA). The DART provides all functionality required to support a high purity germanium (HPGe) detector in a gamma spectrometer system. The DART system includes a computer controlled amplifier, a bias supply, a spectrum stabilizer, an analog-to-digital circuit, data memory, and a ratemeter. It is used with an Ortec GEM-30185 HPGe detector and Maestro-32 MCA Emulator Software. Data are reduced using Quantum Technology GDR gamma spectroscopy software. This system performs qualitative and quantitative analysis of spectra from the HPGe detector, identifying radionuclides and the quantities of each present in samples.

The samples were analyzed using GDR software for the uranium series, thorium series, and naturally occurring potassium-40 (K-

40). Radium-228 (Ra-228) from the thorium series emits no significant photons. Radium-226 (Ra-226) from the uranium series has only one significant photon at 186 keV and its abundance is low, 0.03. These properties make identification and quantification of the isotopes of radium unlikely with normal counting protocols.

The concentrations of surrogates with more abundant high energy photons usually represent the concentration of Ra-226 and Ra-228. Actinium-228 (Ac-228), in the thorium series, is used as a surrogate for Ra-228, and Lead-214 (Pb-214), in the uranium series, is used as a surrogate for Ra-226.

Ra-228 remains in equilibrium with Ac-228 when samples are collected. The equilibrium between Ra-226 and Pb-214 may be disturbed during sample collection because an intermediate progeny, Rn-222 is a gas and some Rn-222 may escape the sample during collection. Equilibrium is reestablished within seven to ten half-lives of Rn-222, which has a half-life of 3.8 days. Results from samples analyzed immediately after collection may underestimate the concentration of Ra-226. In the standard analysis protocol for Ra-226, samples are held for a 30-day ingrowth period to reestablish equilibrium.

Because Ac-228 remains in equilibrium with Ra-228, the only ingrowth is in Pb-214. Little change in the total activity of radium surrogates is expected in samples when the Pb-214 concentration is significantly lower than the Ac-228 concentration and when much of the Rn-222 remains entrained in the interstices of the soil matrix.

Several parameters are set in the GDR software. The sensitivity discriminates against statistically poor peaks. With a lower sensitivity, smaller and less defined peaks can be recognized. The GDR default value of 0.2 is used. The low energy cutoff sets the value below which energies will not be considered in the peak search routine. The low energy cutoff is set to 35 keV because of fall off in detector response at low energy. The library energy tolerance determines how close a peak energy must be to a library energy to identify the peak for activity reporting. The library energy tolerance is set to 1.2 keV. The gamma fraction limit specifies the fraction of secondary peaks that must be present in the spectrum to recognize a radionuclide. The gamma fraction limit is set to 10%.

### Equipment survey

Drilling and other equipment used for soil boring was surveyed using a Ludlum Model 3 survey meter with a 44-9 pancake probe at the end of each workday. The Ludlum Model 3 is a general purpose portable survey instrument. It is used with a Ludlum Model 44-9 pancake type Geiger-Mueller (GM) detector. The Model 44-9 is sensitive to alpha and beta radiation emitted by the uranium series and thorium series and has limited sensitivity to photons.

### III. RESULTS

#### Borehole Radiation Level Measurement Results

The background radiation level with the Ludlum 2200 was approximately 3,000 cpm during the survey on August 11 and 12, corresponding to an instrument response of 14,500 cpm in an extended homogenous source or 5 pCi/g Ra-226 plus Ra-228. On October 14, the background reading was approximately 5,000 cpm, corresponding to an instrument response of 16,500 cpm in an extended homogenous source of 5 pCi/g Ra-226 plus Ra-228. The maximum observed instrument response was 31,615 cpm in BH-17 at a depth of 5 ft, corresponding to approximately 11.3 pCi/g if the probe was in an extended homogenous source. The results of down-hole measurements are in Appendix B.

#### Soil Analysis Results

With the exception of the sample collected from BH-8, the sum of the Ac-228 and Pb-214 in the samples collected on August 11, 2008 and August 12, 2008 was not expected to be in excess of 7.1 pCi/g after ingrowth. The highest initial concentration of Ac-228 plus Pb-214 was 4.7 pCi/g in a sample collected from BH-8 at a depth of 4 ft- 6 ft. After allowing for radon daughter ingrowth, the concentration rose to a total of 5.0 pCi/g, below the EPA action level of 7.1 pCi/g. Samples are identified as SBnn. They were collected from boreholes BHnn, where nn is the sample number. The high-resolution gamma spectroscopy analyses of the boring samples are provided in Appendix D.

### Equipment Survey Results

The background radiation level with the Ludlum 3 was 50 cpm. Surveyed equipment radiation levels were indistinguishable from background. Equipment survey results are in Appendix C.

### IV. CONCLUSIONS

None of the results for samples analyzed immediately after collection were above 7.1 pCi/g, the EPA's action level, of Ra-226 and Ra-228 surrogates. Sample SB-8 had the highest concentration of Pb-214 and was reanalyzed after allowing for Pb-214 ingrowth. After the sample was recounted, the sum of the radium surrogates was below the 7.1 pCi/g level. The instrument response in three boreholes, BH-8, BH-11, and BH-12 indicate that concentrations of radioactivity above the EPA limits may be adjacent to the boreholes. The elevated borehole screening results may also be attributable to the presence of thorium and other radionuclides in bricks and granite pavers in the Chicago fire rubble used to fill Streeterville.

## APPENDIX A

### Borehole locations

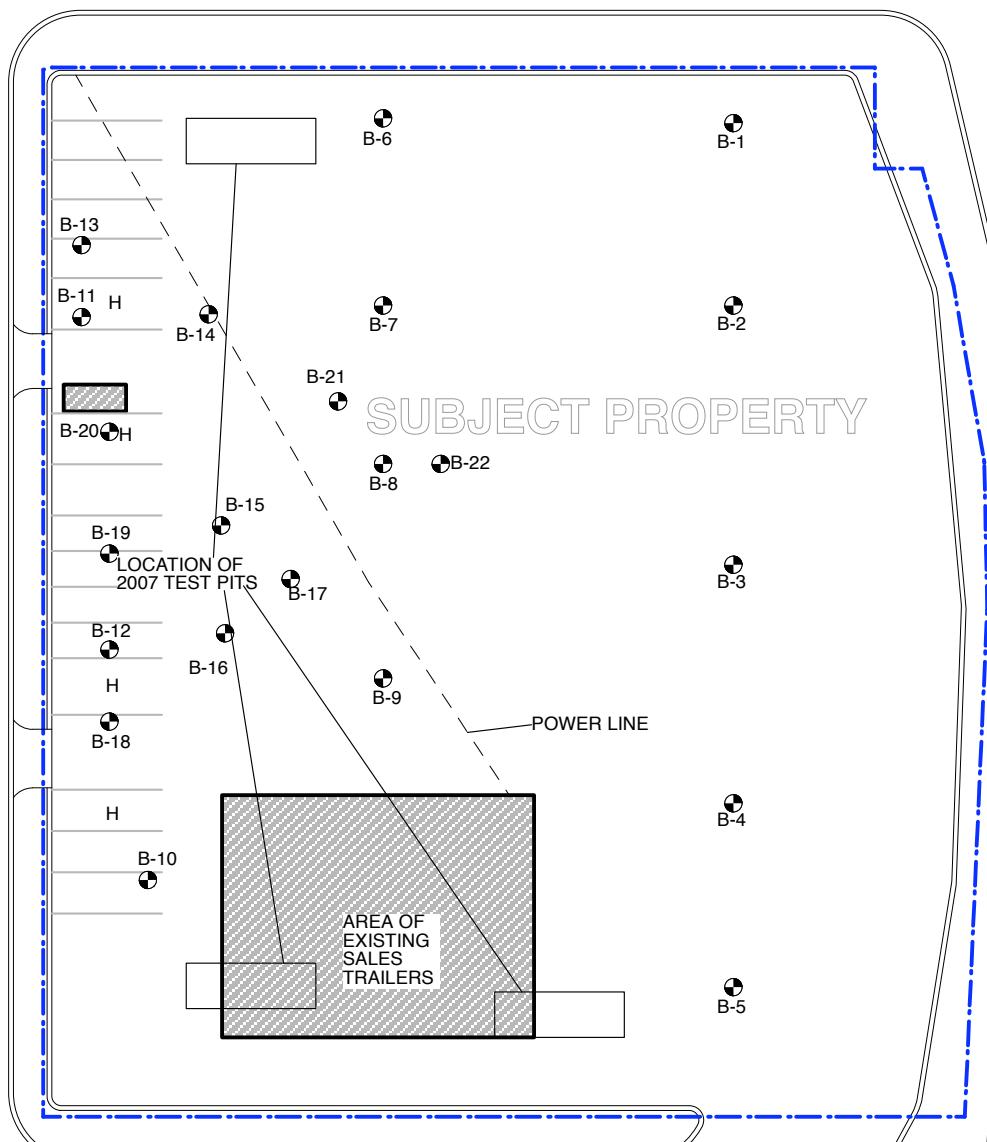
North



### EAST GRAND AVENUE

NORTH PESHTIGO COURT

NORTH LAKE SHORE DRIVE



EAST ILLINOIS STREET

## APPENDIX B

Borehole radiation level measurements

Client: Pioneer Date: 8/11/08  
 Location: 515 N. Peshtigo Court Performed By: Sangho Nam  
 Instrument: Ludlum 2200 S/N: 69279 Probe: 44-10

#### Borehole Count Rates

Depth	<b>BH : 1</b>	<b>BH : 2</b>	<b>BH : 3</b>
0	3996	4919	3399
1	10800	7904	4447
2	10783	<b>15216</b>	8269
3	9402	<b>14781</b>	14911
4	<b>12643</b>	<b>9629</b>	<b>17132</b>
5	<b>11996</b>	11678	<b>14856</b>
6	<b>10760</b>	9846	<b>10013</b>
7	10114	7930	9749
8	10487	8587	9128
9		12023	7872
10			5298
<b>Background</b>	2969	2969	2969
<b>Samples collected</b>	4' - 6'	2' - 4'	4' - 6'

Client: Pioneer Date: 8/11/08  
 Location: 515 N. Peshtigo Court Performed By: Sangho Nam  
 Instrument: Ludlum 2200 S/N: 69279 Probe: 44-10

#### Borehole Count Rates

Depth	<b>BH : 4</b>	<b>BH : 5</b>	<b>BH : 6</b>
0	4319	3739	4951
1	5011	3256	5312
2	16571	8883	<b>14493</b>
3	14015	15510	<b>15156</b>
4		<b>14515</b>	<b>15238</b>
5		<b>14196</b>	14385
6		<b>11694</b>	13746
7		11288	12696
8			11349
9			9306
10			
<b>Background</b>	2969	2969	2969
<b>Samples collected</b>	No Sample	4' - 6'	2' - 4'

Client: Pioneer Date: 8/11/08  
 Location: 515 N. Peshtigo Court Performed By: Sangho Nam  
 Instrument: Ludlum 2200 S/N: 69279 Probe: 44-10

**Borehole Count Rates**

Depth	<b>BH : 7</b>	<b>BH : 8</b>	<b>BH : 9</b>
0	4002	4219	4007
1	4090	4137	3841
2	10646	9929	11375
3	12157	13471	14513
4	11045	<b>21578</b>	11531
5	12238	<b>18551</b>	11718
6	11293	<b>13015</b>	<b>14302</b>
7	11531	11030	<b>14160</b>
8	9960	11132	<b>12976</b>
9	6642	8856	10742
10			
<b>Background</b>	2969	2969	2969
<b>Samples collected</b>	No Sample	4' - 6'	6' - 8'

Client: Pioneer Date: 8/11/08 - 8/12/08  
 Location: 515 N. Peshtigo Court Performed By: Sangho Nam  
 Instrument: Ludlum 2200 S/N: 69279 Probe: 44-10

**Borehole Count Rates**

Depth	<b>BH : 10</b>	<b>BH : 11</b>	<b>BH : 12</b>
0	4098	3730	3914
1	8416	5187	8890
2	<b>15671</b>	<b>11571</b>	<b>17222</b>
3	<b>15947</b>	<b>22282</b>	<b>22367</b>
4	<b>15488</b>	<b>19745</b>	<b>20108</b>
5	12550	16685	18093
6	12019	12611	16327
7	10572	14447	12613
8		16115	8073
9		15663	
10			
<b>Background</b>	2969	2923	2923
<b>Samples collected</b>	2' - 4'	2' - 4'	2' - 4'

**Client:** Pioneer                    **Date:** 10/14/2008  
**Location:** 515 N. Peshtigo Court    **Performed By:** Juan Correa  
**Instrument:** Ludlum 2200    **S/N:** 69279    **Probe:** 44-10

#### Borehole Count Rates

Depth	BH : 13	BH : 14	BH : 15
0	4917	4976	4851
1	6900	5142	6145
2	20561	14313	9564
3	20968	15637	10052
4	22015	20338	14059
5	18181	19777	19706
6	19676	20100	17181
7	18539	20424	14895
8	18783	16389	15112
9			
10			
<b>Background</b>	4853	4853	4853
<b>Samples collected</b>	No Sample	No Sample	No Sample

**Client:** Pioneer                    **Date:** 10/14/2008  
**Location:** 515 N. Peshtigo Court    **Performed By:** Juan Correa  
**Instrument:** Ludlum 2200    **S/N:** 69279    **Probe:** 44-10

#### Borehole Count Rates

Depth	BH : 16	BH : 17	BH : 18
0	4918	9477	6165
1	10201	8039	18427
2	19666	21072	29085
3	22498	17970	30975
4	20074	17625	28652
5	23172	31615	22505
6	21268	27117	20450
7	14115	18217	21234
8	12142	14252	18538
9			
10			
<b>Background</b>	4853	4853	4853
<b>Samples collected</b>	No Sample	No Sample	No Sample

**Client:** Pioneer                    **Date:** 10/14/2008  
**Location:** 515 N. Peshtigo Court    **Performed By:** Juan Correa  
**Instrument:** Ludlum 2200    **S/N:** 69279    **Probe:** 44-10

#### Borehole Count Rates

Depth	BH : B19	BH : B20	BH : B21
0	6595	9036	5197
1	16727	19084	13663
2	12884	20185	12710
3	12078	19355	16748
4	14881	15388	17398
5	20184	16313	18057
6	17688	15669	14877
7	18573	20340	10222
8	13171	19129	8694
9			
10			
<b>Background</b>	4853	4853	4853
<b>Samples collected</b>	4' - 6'	No Sample	No Sample

**Client:** Pioneer                    **Date:** 10/14/2008  
**Location:** 515 N. Peshtigo Court    **Performed By:** Juan Correa  
**Instrument:** Ludlum 2200    **S/N:** 69279    **Probe:** 44-10

#### Borehole Count Rates

Depth	BH : B22
0	4386
1	10052
2	18417
3	19069
4	23180
5	22344
6	15925
7	14672
8	10642
9	
10	
<b>Background</b>	4853
<b>Samples collected</b>	4' - 6'

## APPENDIX C

Gamma spectroscopy analysis summary table and reports

- Gamma Spectroscopy Results Summary

Sample NO.	Borehole ID	Depth Ft	Pb-214 pCi/g	Ac-228 pCi/g	TOTAL pCi/g
081941	SB-1	4 - 6	0.8	0.6	1.4
081942	SB-2	2 - 4	1.8	1.0	2.8
081943	SB-3	4 - 6	1.2	0.8	2.0
081944	SB-5	4 - 6	1.4	0.8	2.2
081945	SB-6	2 - 4	1.4	1.0	2.4
081946	SB-8	4 - 6	3.7	1.0	4.7
081946A	SB-8	4 - 6	3.9	1.1	5.0
081947	SB-9	6 - 8	1.7	1.0	2.7
081948	SB-10	2 - 4	1.6	1.1	2.7
081949	SB-11	2 - 4	1.3	0.8	2.1
081950	SB-12	2 - 4	1.5	0.8	2.3
082400	SB-13	2 - 4	1.5	1.0	2.5
082401	SB-14	4 - 6	1.1	0.8	1.9
082402	SB-15	4 - 6	1.2	0.8	2.0
082403	SB-16	4 - 6	2.3	1.2	3.5
082404	SB-17	4 - 6	3.0	0.8	3.8
082405	SB-18	2 - 4	2.5	1.0	3.5
082406	SB-19	4 - 6	1.3	0.8	2.1
082407	SB-20	2 - 4	1.4	0.9	2.3
082408	SB-21	2 - 4	0.7	0.5	1.2
082409	SB-22	4 - 6	1.9	1.2	3.1

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GDR/PC RSSI High Resolution Gamma Spectroscopy Ver. 6.02a  
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Sample ID : 081941 PIONEER PESHTIGO SITE B-1

-----  
Sample Size . . . . . 9.44e+002 g | Spectrum File . . H:\MAESTROS\081941.CHN  
Sampling Start. . . . . 00-00-00 00:00 | Counting Start. . . . . 08-13-08 11:29  
Sampling Stop . . . . . 00-00-00 00:00 | Live Time . . . . . . . . . 3600 Sec  
Current Date. . . . . 00-00-00 00:00 | Real Time . . . . . . . . . 3604 Sec  
-----

Detector #: 1  
Energy(keV)= 6.97 + 0.232\*Ch + 0.00e+000\*Ch^2 + 0.00e+000\*Ch^3 07-21-08 11:19  
FWHM(keV) = 0.94 + 0.015\*En + 2.91e-004\*En^2 + 0.00e+000\*En^3 08-13-07 15:28  
Where En = Sqrt(Energy in keV)  
-----

Sensitivity . . . . . 0.20 | Search Start / End. . . . . 0 / 8191  
Sigma Multiplier. . . . . 1.00

#### PEAK SEARCH RESULTS

PK. #	ENERGY (keV)	ADDRESS CHANNEL	NET COUNTS	UN- CERTAINTY	C.L. COUNTS	BKG COUNTS	FWHM (keV)	FLAG
1	74.80	292.85	234	51	97	643	0.83	a
2	76.88	301.85	434	53	97	693	1.03	b
3	86.84	344.84	121	46	87	644	0.86	
4	92.57	369.61	139	52	100	735	1.68	
5	185.86	772.39	314	49	90	563	1.43	
6	209.29	873.52	192	45	86	450	1.23	
7	238.52	999.74	1059	53	87	410	1.11	a
8	241.73	1013.62	291	49	94	454	1.37	b
9	270.26	1136.78	90	35	67	307	1.23	
10	295.04	1243.77	549	43	75	287	1.14	a
11	299.92	1264.85	59	29	55	219	0.90	b
12	338.09	1429.64	187	33	59	230	0.98	
13	351.75	1488.64	991	43	58	218	1.28	
14	462.48	1966.71	22	24	47	152	1.84	NET < CL
15	510.61	2174.53	179	31	58	179	1.89	
16	583.03	2487.19	378	29	44	107	1.76	
17	609.11	2599.81	736	34	43	106	1.41	
18	727.13	3109.35	66	22	41	93	1.95	
19	794.86	3401.80	53	16	30	50	1.54	
20	860.44	3684.97	79	15	26	37	1.14	
21	911.04	3903.41	246	24	36	73	1.47	
22	934.05	4002.77	20	18	35	70	0.36	NET < CL
23	964.36	4133.64	74	19	36	43	2.07	a
24	968.83	4152.93	201	22	37	50	1.63	b
25	1120.06	4805.89	157	22	37	71	1.65	
26	1460.48	6275.68	1277	38	27	32	1.81	
27	1729.43	7436.92	36	7	9	4	1.61	
28	1763.97	7586.03	124	15	22	21	2.05	

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GDR/PC                    RSSI High Resolution Gamma Spectroscopy                    Ver. 6.02a  
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=====  
BACKGROUND SUBTRACT RESULTS  
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Sample ID :        081941 PIONEER PESHTIGO SITE B-1

-----  
Bkg File: . . . H:\GDR\BKG\NOCAL.BKG | Counting Start. . . . . 08-13-08 11:29  
ID: . . . . . 24 Hour Background | Current Date . . . . . 00-00-00 00:00  
-----

PK#	ENERGY (keV)	FWHM (keV)	OLD NET COUNTS	OLD UN- CERTAINTY	NEW NET COUNTS	NEW UN- CERTAINTY	FLAG
1	74.80	0.83	234	51	176	51	
4	92.57	1.68	139	52	89	52	NET < CL
5	185.86	1.43	314	49	285	49	
7	238.52	1.11	1059	53	1029	54	
10	295.04	1.14	549	43	525	43	
13	351.75	1.28	991	43	935	43	
15	510.61	1.89	179	31	92	32	
16	583.03	1.76	378	29	355	29	
17	609.11	1.41	736	34	642	35	
21	911.04	1.47	246	24	223	24	
24	968.83	1.63	201	22	189	23	
25	1120.06	1.65	157	22	141	22	
26	1460.48	1.81	1277	38	1092	38	
28	1763.97	2.05	124	15	104	15	

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GDR/PC RSSI High Resolution Gamma Spectroscopy Ver. 6.02a  
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NUCLIDE ACTIVITY SUMMARY

Sample ID: 081941 PIONEER PESHTIGO SITE B-1

-----  
Sample Size . . . . . 9.44e+002 g | Spectrum File . . H:\MAESTROS\081941.CHN  
Sampling Start. . . . . 00-00-00 00:00 | Counting Start. . . . . 08-13-08 11:29  
Sampling Stop . . . . . 00-00-00 00:00 | Buildup Time. . . . . 0.00e+000 Hrs  
Current Date. . . . . 00-00-00 00:00 | Decay Time [OFF]. . . . . 0.00e+000 Hrs  
-----

Efficiency File.H:\GDR\EFF\500MAR.EFF | Library File. . . . H:\GDR\LIB\1001.LIB  
ID. . . . . . . . . 500 MARINELLI | ID. . . . . . . TH, U, AND K SERIES  
-----

Eff.= 1/[2.90e-002\*En^-2.65e+000 + 9.35e+001\*En^8.20e-001] 02-19-08 12:00  
-----

Gamma Fraction Limit >= . . . 10.00 % | Decay Limit <=. . . 8.000 Halflives  
Library Energy Tolerance. . . 1.20  
-----

FINAL ACTIVITY REPORT

Nuclide	Energy (keV)	Conc +- 1.00sigma (uCi/g)	Halflife )	Peaks (hrs)	Peaks Found
Pb-212	Average:	5.52e-007	+2.86e-008	1.06e+001	4 of 4
	74.82		I.D.Only		
	77.11		I.D.Only		
	238.63	5.53e-007	+2.88e-008		
	300.09	4.91e-007	+2.41e-007		
Pb-214	Average:	7.92e-007	+3.12e-008	4.47e-001	4 of 4
	77.11		I.D.Only		
	241.98	8.01e-007	+1.57e-007		
	295.21	7.62e-007	+6.30e-008		
	351.92	8.02e-007	+3.69e-008		
Ra-226	186.10		I.D.Only	1.40e+007	1 of 1
Ac-228	Average:	5.98e-007	+4.41e-008	6.13e+000	3 of 3
	338.32	5.09e-007	+8.90e-008		
	911.07	5.54e-007	+5.94e-008		
	969.11	8.25e-007	+9.82e-008		
Tl-208	Average:	2.01e-007	+1.60e-008	5.09e-002	2 of 3
	510.84	1.82e-007	+6.31e-008		
	583.14	2.02e-007	+1.66e-008		
Bi-214	Average:	7.02e-007	+3.38e-008	3.32e-001	3 of 4
	609.31	6.88e-007	+3.70e-008		
	1120.30	7.61e-007	+1.19e-007		
	1764.50	7.79e-007	+1.14e-007		
Bi-212	727.17	5.58e-007	+1.84e-007	1.01e+000	1 of 4
K-40	1460.80	1.04e-005	+3.63e-007	1.12e+013	1 of 1
TOTAL:		1.38e-005	uCi/g		

## UNKNOWN PEAKS

Energy (keV)	Centroid Channel	Net Counts	Un- Certainty	C.L. Counts	Bkg. Counts	FWHM (keV)	Net Gamma/sec
86.84	344.84	121	46	87	644	0.86	1.052e+000
209.29	873.52	192	45	86	450	1.23	1.481e+000
270.26	1136.78	90	35	67	307	1.23	8.258e-001
794.86	3401.80	53	16	30	50	1.54	1.141e+000
860.44	3684.97	79	15	26	37	1.14	1.822e+000
964.36	4133.64	74	19	36	43	2.07	1.859e+000
1729.43	7436.92	36	7	9	4	1.61	1.462e+000

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GDR/PC RSSI High Resolution Gamma Spectroscopy Ver. 6.02a  
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Sample ID : 081942 PIONEER PESHTIGO SITE B-2

-----  
Sample Size . . . . . 6.10e+002 g | Spectrum File . . H:\MAESTROS\081942.CHN  
Sampling Start. . . . . 00-00-00 00:00 | Counting Start. . . . . 08-13-08 13:03  
Sampling Stop . . . . . 00-00-00 00:00 | Live Time . . . . . . . . . 3600 Sec  
Current Date. . . . . 00-00-00 00:00 | Real Time . . . . . . . . . 3605 Sec  
-----

Detector #: 1  
Energy(keV)= 6.97 + 0.232\*Ch + 0.00e+000\*Ch^2 + 0.00e+000\*Ch^3 07-21-08 11:19  
FWHM(keV) = 0.94 + 0.015\*En + 2.91e-004\*En^2 + 0.00e+000\*En^3 08-13-07 15:28  
Where En = Sqrt(Energy in keV)  
-----

Sensitivity . . . . . 0.20 | Search Start / End. . . . . 0 / 8191  
Sigma Multiplier. . . . . 1.00

#### PEAK SEARCH RESULTS

PK. #	ENERGY (keV)	ADDRESS CHANNEL	NET COUNTS	UN- CERTAINTY	C.L. COUNTS	BKG COUNTS	FWHM (keV)	FLAG
1	74.67	292.29	310	55	105	745	0.86	a
2	76.89	301.88	503	53	94	712	0.87	b
3	84.10	333.01	157	57	114	717	1.17	a
4	86.93	345.25	254	57	110	722	1.11	b
5	92.70	370.14	198	53	101	755	1.28	
6	185.75	771.90	473	52	94	572	1.65	
7	238.55	999.88	1287	60	99	498	1.19	a
8	241.58	1012.96	375	50	93	481	1.39	b
9	270.10	1136.09	157	42	81	363	2.45	
10	295.02	1243.70	796	43	65	272	1.25	
11	338.11	1429.73	227	32	56	216	1.06	
12	351.74	1488.60	1425	48	58	221	1.38	
13	462.73	1967.78	33	27	52	179	0.61	NET < CL
14	510.60	2174.46	163	31	58	179	1.57	
15	582.97	2486.95	369	28	42	104	1.47	
16	609.16	2600.02	1005	38	42	101	1.35	
17	727.05	3109.02	78	22	40	95	1.21	
18	768.33	3287.26	104	22	41	80	1.56	
19	785.62	3361.90	18	18	35	75	4.93	NET < CL
20	794.73	3401.25	51	19	36	76	2.82	
21	911.02	3903.34	294	24	35	62	1.48	
22	933.87	4001.98	65	18	32	60	1.44	
23	964.39	4133.77	35	16	30	54	0.88	a
24	968.87	4153.11	180	21	32	56	1.51	b
25	1120.05	4805.84	214	24	40	77	1.24	
26	1237.70	5313.81	71	18	32	57	2.51	
27	1377.46	5917.25	70	12	19	16	2.07	
28	1407.53	6047.05	14	14	28	42	1.02	NET < CL
29	1460.39	6275.28	1108	37	36	58	2.00	
30	1729.29	7436.28	52	11	17	13	7.47	

31 1763.98 7586.08 199 16 14 9 2.00

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GDR/PC                    RSSI High Resolution Gamma Spectroscopy                    Ver. 6.02a  
=====  
                          BACKGROUND SUBTRACT RESULTS  
=====

Sample ID :            081942 PIONEER PESHTIGO SITE B-2

Bkg File: . . . . H:\GDR\BKG\NOCAL.BKG | Counting Start. . . . . 08-13-08 13:03  
ID: . . . . . 24 Hour Background | Current Date . . . . . 00-00-00 00:00

PK#	ENERGY (keV)	FWHM (keV)	OLD NET COUNTS	OLD UN- CERTAINTY	NEW NET COUNTS	NEW UN- CERTAINTY	FLAG
1	74.67	0.86	310	55	260	56	
3	84.10	1.17	157	57	143	57	
5	92.70	1.28	198	53	148	54	
6	185.75	1.65	473	52	444	52	
7	238.55	1.19	1287	60	1257	60	
10	295.02	1.25	796	43	761	43	
12	351.74	1.38	1425	48	1369	48	
14	510.60	1.57	163	31	76	31	
15	582.97	1.47	369	28	346	29	
16	609.16	1.35	1005	38	911	38	
21	911.02	1.48	294	24	271	24	
24	968.87	1.51	180	21	168	21	
25	1120.05	1.24	214	24	198	24	
29	1460.39	2.00	1108	37	923	38	
31	1763.98	2.00	199	16	179	16	

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GDR/PC RSSI High Resolution Gamma Spectroscopy Ver. 6.02a  
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NUCLIDE ACTIVITY SUMMARY

Sample ID: 081942 PIONEER PESHTIGO SITE B-2

-----  
Sample Size . . . . . 6.10e+002 g | Spectrum File . . H:\MAESTROS\081942.CHN  
Sampling Start. . . . . 00-00-00 00:00 | Counting Start. . . . . 08-13-08 13:03  
Sampling Stop . . . . . 00-00-00 00:00 | Buildup Time. . . . . 0.00e+000 Hrs  
Current Date. . . . . 00-00-00 00:00 | Decay Time [OFF]. . . . . 0.00e+000 Hrs  
-----

Efficiency File.H:\GDR\EFF\500MAR.EFF | Library File. . . . H:\GDR\LIB\1001.LIB  
ID. . . . . . . . . 500 MARINELLI | ID. . . . . . . TH, U, AND K SERIES  
-----

Eff.= 1/[2.90e-002\*En^-2.65e+000 + 9.35e+001\*En^8.20e-001] 02-19-08 12:00  
-----

Gamma Fraction Limit >= . . . 10.00 % | Decay Limit <=. . . 8.000 Halflives  
Library Energy Tolerance. . . 1.20  
-----

FINAL ACTIVITY REPORT

Nuclide	Energy (keV)	Conc +- 1.00sigma (uCi/g)	Halflife )	Peaks (hrs)	Peaks Found
Pb-212	74.82	I.D.Only	1.06e+001	3 of	4
	77.11	I.D.Only			
	238.63	1.05e-006 +-4.99e-008			
Pb-214	Average:	1.79e-006 +-5.19e-008	4.47e-001	4 of	4
	77.11	I.D.Only			
	241.98	1.82e-006 +-2.48e-007			
	295.21	1.71e-006 +-9.68e-008			
	351.92	1.82e-006 +-6.36e-008			
Th-228	84.37	I.D.Only	1.68e+004	1 of	2
Th-234	92.80	I.D.Only	5.78e+002	1 of	3
Ra-226	186.10	I.D.Only	1.40e+007	1 of	1
Ac-228	Average:	1.04e-006 +-6.73e-008	6.13e+000	3 of	3
	338.32	9.58e-007 +-1.35e-007			
	911.07	1.04e-006 +-9.36e-008			
	969.11	1.13e-006 +-1.40e-007			
Tl-208	Average:	3.00e-007 +-2.43e-008	5.09e-002	2 of	3
	510.84	2.33e-007 +-9.69e-008			
	583.14	3.04e-007 +-2.51e-008			
Bi-214	Average:	1.58e-006 +-5.65e-008	3.32e-001	4 of	4
	609.31	1.51e-006 +-6.29e-008			
	768.36	1.91e-006 +-4.08e-007			
	1120.30	1.65e-006 +-2.03e-007			
	1764.50	2.08e-006 +-1.82e-007			
Bi-212	727.17	1.02e-006 +-2.86e-007	1.01e+000	1 of	4
K-40	1460.80	1.36e-005 +-5.54e-007	1.12e+013	1 of	1
TOTAL:		2.04e-005 uCi/g			

## UNKNOWN PEAKS

Energy (keV)	Centroid Channel	Net Counts	Un- Certainty	C.L. Counts	Bkg. Counts	FWHM (keV)	Net Gamma/sec
86.93	345.25	254	57	110	722	1.11	2.215e+000
270.10	1136.09	157	42	81	363	2.45	1.432e+000
794.73	3401.25	51	19	36	76	2.82	1.098e+000
933.87	4001.98	65	18	32	60	1.44	1.593e+000
964.39	4133.77	35	16	30	54	0.88	8.740e-001
1237.70	5313.81	71	18	32	57	2.51	2.207e+000
1377.46	5917.25	70	12	19	16	2.07	2.364e+000
1729.29	7436.28	52	11	17	13	7.47	2.107e+000

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GDR/PC RSSI High Resolution Gamma Spectroscopy Ver. 6.02a  
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Sample ID : 081943 PIONEER PESHTIGO SITE B-3

-----  
Sample Size . . . . . 7.05e+002 g | Spectrum File . . H:\MAESTROS\081943.CHN  
Sampling Start. . . . . 00-00-00 00:00 | Counting Start. . . . . 08-13-08 14:06  
Sampling Stop . . . . . 00-00-00 00:00 | Live Time . . . . . . . . . 3600 Sec  
Current Date. . . . . 00-00-00 00:00 | Real Time . . . . . . . . . 3604 Sec  
-----

Detector #: 1

Energy(keV)= 6.97 + 0.232\*Ch + 0.00e+000\*Ch^2 + 0.00e+000\*Ch^3 07-21-08 11:19

FWHM(keV) = 0.94 + 0.015\*En + 2.91e-004\*En^2 + 0.00e+000\*En^3 08-13-07 15:28  
Where En = Sqrt(Energy in keV)

Sensitivity . . . . . 0.20 | Search Start / End. . . . . 0 / 8191  
Sigma Multiplier. . . . . 1.00

#### PEAK SEARCH RESULTS

PK. #	ENERGY (keV)	ADDRESS CHANNEL	NET COUNTS	UN- CERTAINTY	C.L. COUNTS	BKG COUNTS	FWHM (keV)	FLAG
1	74.90	293.30	316	56	106	717	0.93	a
2	77.01	302.39	395	51	93	664	0.98	b
3	87.25	346.62	141	49	94	691	0.78	
4	92.58	369.64	160	53	101	755	1.30	
5	186.07	773.29	288	49	91	568	1.35	
6	238.65	1000.32	1000	56	95	473	1.13	a
7	241.81	1013.93	372	49	91	469	1.33	b
8	270.77	1138.97	64	37	71	352	1.36	NET < CL
9	295.28	1244.83	635	41	64	266	1.11	
10	327.65	1384.56	66	29	56	219	2.13	
11	338.32	1430.65	200	33	59	227	1.42	
12	351.95	1489.48	1167	46	63	246	1.33	
13	510.90	2175.77	160	31	58	171	1.96	
14	583.12	2487.61	335	30	47	130	1.32	
15	609.25	2600.43	899	35	38	80	1.75	
16	727.20	3109.66	79	19	34	67	2.63	
17	768.37	3287.43	89	21	40	77	2.24	
18	911.17	3903.98	250	21	29	48	1.67	
19	933.72	4001.34	51	18	33	66	2.10	
20	968.76	4152.64	174	18	26	35	1.69	
21	1120.38	4807.26	190	20	31	49	1.45	
22	1238.09	5315.49	90	20	36	62	1.37	
23	1377.46	5917.23	23	17	35	54	0.63	NET < CL
24	1460.61	6276.26	860	31	21	20	1.91	
25	1729.30	7436.32	41	6	0	0	1.49	
26	1764.04	7586.32	148	15	19	16	2.10	

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GDR/PC                    RSSI High Resolution Gamma Spectroscopy                    Ver. 6.02a  
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=====  
BACKGROUND SUBTRACT RESULTS  
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Sample ID :            081943 PIONEER PESHTIGO SITE B-3

-----  
Bkg File: . . . H:\GDR\BKG\NOCAL.BKG | Counting Start. . . . . 08-13-08 14:06  
ID: . . . . . 24 Hour Background | Current Date . . . . . 00-00-00 00:00  
-----

PK#	ENERGY (keV)	FWHM (keV)	OLD NET COUNTS	OLD UN- CERTAINTY	NEW NET COUNTS	NEW UN- CERTAINTY	FLAG
1	74.90	0.93	316	56	248	56	
4	92.58	1.30	160	53	110	53	
5	186.07	1.35	288	49	259	49	
6	238.65	1.13	1000	56	973	56	
9	295.28	1.11	635	41	600	41	
12	351.95	1.33	1167	46	1111	47	
13	510.90	1.96	160	31	73	31	
14	583.13	1.32	335	30	312	30	
15	609.25	1.75	899	35	805	35	
18	911.17	1.67	250	21	227	21	
20	968.76	1.69	174	18	162	18	
21	1120.38	1.45	190	20	174	20	
24	1460.61	1.91	860	31	675	31	
26	1764.04	2.10	148	15	128	15	

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GDR/PC RSSI High Resolution Gamma Spectroscopy Ver. 6.02a  
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NUCLIDE ACTIVITY SUMMARY

Sample ID: 081943 PIONEER PESHTIGO SITE B-3

-----  
Sample Size . . . . . 7.05e+002 g | Spectrum File . . H:\MAESTROS\081943.CHN  
Sampling Start. . . . . 00-00-00 00:00 | Counting Start. . . . . 08-13-08 14:06  
Sampling Stop . . . . . 00-00-00 00:00 | Buildup Time. . . . . 0.00e+000 Hrs  
Current Date. . . . . 00-00-00 00:00 | Decay Time [OFF]. . . . . 0.00e+000 Hrs  
-----

Efficiency File.H:\GDR\EFF\500MAR.EFF | Library File. . . . H:\GDR\LIB\1001.LIB  
ID. . . . . . . . . 500 MARINELLI | ID. . . . . . . TH, U, AND K SERIES  
-----

Eff.= 1/[2.90e-002\*En^-2.65e+000 + 9.35e+001\*En^8.20e-001] 02-19-08 12:00  
-----

Gamma Fraction Limit >= . . . 10.00 % | Decay Limit <=. . . 8.000 Halflives  
Library Energy Tolerance. . . 1.20  
-----

FINAL ACTIVITY REPORT

Nuclide	Energy (keV)	Conc +- 1.00sigma (uCi/g)	Halflife )	Peaks (hrs)	Peaks Found
Pb-212	74.82		I.D.Only	1.06e+001	3 of 4
	77.11		I.D.Only		
	238.63	7.00e-007 +-4.04e-008			
Pb-214	Average:	1.24e-006 +-4.35e-008	4.47e-001	4 of 4	
	77.11		I.D.Only		
	241.98	1.28e-006 +-2.11e-007			
	295.21	1.17e-006 +-7.96e-008			
	351.92	1.28e-006 +-5.35e-008			
Th-234	92.80		I.D.Only	5.78e+002	1 of 3
Ra-226	186.10		I.D.Only	1.40e+007	1 of 1
Ac-228	Average:	7.97e-007 +-5.30e-008	6.13e+000	3 of 3	
	338.32	7.32e-007 +-1.19e-007			
	911.07	7.55e-007 +-7.10e-008			
	969.11	9.46e-007 +-1.07e-007			
Tl-208	Average:	2.35e-007 +-2.18e-008	5.09e-002	2 of 3	
	510.84	1.96e-007 +-8.30e-008			
	583.14	2.38e-007 +-2.26e-008			
Bi-214	Average:	1.18e-006 +-4.55e-008	3.32e-001	4 of 4	
	609.31	1.16e-006 +-5.09e-008			
	768.36	1.41e-006 +-3.41e-007			
	1120.30	1.26e-006 +-1.47e-007			
	1764.50	1.28e-006 +-1.54e-007			
Bi-212	727.17	8.93e-007 +-2.14e-007	1.01e+000	1 of 4	
K-40	1460.80	8.59e-006 +-3.97e-007	1.12e+013	1 of 1	
TOTAL:		1.36e-005 uCi/g			

## UNKNOWN PEAKS

Energy (keV)	Centroid Channel	Net Counts	Un- Certainty	C.L. Counts	Bkg. Counts	FWHM (keV)	Net Gamma/sec
87.25	346.62	141	49	94	691	0.78	1.227e+000
327.65	1384.56	66	29	56	219	2.13	6.934e-001
933.72	4001.34	51	18	33	66	2.10	1.253e+000
1238.09	5315.49	90	20	36	62	1.37	2.778e+000
1729.30	7436.32	41	6	0	0	1.49	1.669e+000

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GDR/PC RSSI High Resolution Gamma Spectroscopy Ver. 6.02a  
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Sample ID : 081944 PIONEER PESHTIGO SITE B-5

-----  
Sample Size . . . . . 8.41e+002 g | Spectrum File . . H:\MAESTROS\081944.CHN  
Sampling Start. . . . . 00-00-00 00:00 | Counting Start. . . . . 08-13-08 16:52  
Sampling Stop . . . . . 00-00-00 00:00 | Live Time . . . . . . . . . 3600 Sec  
Current Date. . . . . 00-00-00 00:00 | Real Time . . . . . . . . . 3605 Sec  
-----

Detector #: 1

Energy(keV)= 6.97 + 0.232\*Ch + 0.00e+000\*Ch^2 + 0.00e+000\*Ch^3 07-21-08 11:19

FWHM(keV) = 0.94 + 0.015\*En + 2.91e-004\*En^2 + 0.00e+000\*En^3 08-13-07 15:28  
Where En = Sqrt(Energy in keV)

Sensitivity . . . . . 0.20 | Search Start / End. . . . . 0 / 8191  
Sigma Multiplier. . . . . 1.00

#### PEAK SEARCH RESULTS

PK. #	ENERGY (keV)	ADDRESS CHANNEL	NET COUNTS	UN- CERTAINTY	C.L. COUNTS	BKG COUNTS	FWHM (keV)	FLAG
1	74.83	293.00	343	61	118	865	0.99	a
2	77.08	302.71	539	62	113	880	1.01	b
3	87.19	346.35	118	53	102	817	0.48	
4	92.94	371.17	274	56	105	815	1.11	
5	186.10	773.40	423	54	99	683	1.57	
6	209.01	872.33	122	43	83	503	1.43	
7	238.68	1000.42	1295	57	91	471	1.06	a
8	241.88	1014.25	481	56	106	569	1.45	b
9	270.12	1136.18	116	38	72	357	1.72	
10	295.31	1244.94	840	48	79	309	1.17	a
11	300.21	1266.10	72	36	71	285	1.13	b
12	328.06	1386.33	52	36	71	295	0.73	NET < CL
13	338.37	1430.86	266	36	65	275	1.24	
14	351.96	1489.52	1568	48	55	198	1.35	
15	463.01	1969.02	138	26	46	124	1.81	
16	510.81	2175.38	191	33	60	200	1.48	
17	583.25	2488.15	419	32	49	143	1.41	
18	609.34	2600.79	1101	41	49	139	1.58	
19	727.16	3109.49	70	24	45	113	1.46	
20	768.28	3287.05	75	25	47	123	1.17	
21	860.72	3686.14	85	20	36	61	1.64	
22	911.26	3904.37	308	24	34	63	2.40	
23	933.86	4001.93	73	20	38	68	3.00	
24	968.83	4152.92	196	23	38	82	1.27	
25	1120.14	4806.24	232	25	40	81	2.26	
26	1238.39	5316.80	76	23	45	92	1.63	
27	1377.44	5917.15	38	16	31	49	0.71	
28	1460.61	6276.26	1242	37	25	27	1.88	
29	1729.15	7435.71	45	11	19	16	2.96	
30	1764.05	7586.36	179	16	19	17	1.67	

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GDR/PC                    RSSI High Resolution Gamma Spectroscopy                    Ver. 6.02a  
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=====  
BACKGROUND SUBTRACT RESULTS  
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Sample ID :        081944 PIONEER PESHTIGO SITE B-5

-----  
Bkg File: . . . . H:\GDR\BKG\NOCAL.BKG | Counting Start. . . . . 08-13-08 16:52  
ID: . . . . . 24 Hour Background | Current Date . . . . . 00-00-00 00:00  
-----

PK#	ENERGY (keV)	FWHM (keV)	OLD NET COUNTS	OLD UN- CERTAINTY	NEW NET COUNTS	NEW UN- CERTAINTY	FLAG
1	74.83	0.99	343	61	278	62	
4	92.94	1.11	274	56	224	56	
5	186.10	1.57	423	54	394	55	
7	238.68	1.06	1295	57	1270	58	
10	295.31	1.17	840	48	809	48	
14	351.96	1.35	1568	48	1512	48	
16	510.81	1.48	191	33	104	33	
17	583.25	1.41	419	32	396	32	
18	609.34	1.58	1101	41	1007	41	
22	911.26	2.40	308	24	285	24	
24	968.83	1.27	196	23	184	23	
25	1120.14	2.26	232	25	216	25	
28	1460.61	1.88	1242	37	1057	37	
30	1764.05	1.67	179	16	159	16	

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GDR/PC RSSI High Resolution Gamma Spectroscopy Ver. 6.02a  
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NUCLIDE ACTIVITY SUMMARY

Sample ID: 081944 PIONEER PESHTIGO SITE B-5

-----  
Sample Size . . . . . 8.41e+002 g | Spectrum File . . H:\MAESTROS\081944.CHN  
Sampling Start. . . . . 00-00-00 00:00 | Counting Start. . . . . 08-13-08 16:52  
Sampling Stop . . . . . 00-00-00 00:00 | Buildup Time. . . . . 0.00e+000 Hrs  
Current Date. . . . . 00-00-00 00:00 | Decay Time [OFF]. . . . . 0.00e+000 Hrs  
-----

Efficiency File.H:\GDR\EFF\500MAR.EFF | Library File. . . . H:\GDR\LIB\1001.LIB  
ID. . . . . . . . . 500 MARINELLI | ID. . . . . . . TH, U, AND K SERIES  
-----

Eff.= 1/[2.90e-002\*En^-2.65e+000 + 9.35e+001\*En^8.20e-001] 02-19-08 12:00  
-----

Gamma Fraction Limit >= . . . 10.00 % | Decay Limit <=. . . 8.000 Halflives  
Library Energy Tolerance. . . 1.20  
-----

FINAL ACTIVITY REPORT

Nuclide	Energy (keV)	Conc +- 1.00sigma (uCi/g)	Halflife )	Peaks (hrs)	Peaks Found
Pb-212	Average:	7.65e-007	+ -3.46e-008	1.06e+001	4 of 4
	74.82		I.D.Only		
	77.11		I.D.Only		
	238.63	7.66e-007	+ -3.48e-008		
	300.09	6.72e-007	+ -3.35e-007		
Pb-214	Average:	1.42e-006	+ -3.94e-008	4.47e-001	4 of 4
	77.11		I.D.Only		
	241.98	1.46e-006	+ -2.03e-007		
	295.21	1.32e-006	+ -7.85e-008		
	351.92	1.46e-006	+ -4.67e-008		
Th-234	92.80		I.D.Only	5.78e+002	1 of 3
Ra-226	186.10		I.D.Only	1.40e+007	1 of 1
Ac-228	Average:	8.21e-007	+ -5.16e-008	6.13e+000	3 of 3
	338.32	8.15e-007	+ -1.11e-007		
	911.07	7.95e-007	+ -6.78e-008		
	969.11	8.99e-007	+ -1.14e-007		
Tl-208	Average:	2.51e-007	+ -1.97e-008	5.09e-002	2 of 3
	510.84	2.33e-007	+ -7.35e-008		
	583.14	2.52e-007	+ -2.04e-008		
Bi-214	Average:	1.23e-006	+ -4.41e-008	3.32e-001	4 of 4
	609.31	1.21e-006	+ -4.95e-008		
	768.36	9.96e-007	+ -3.29e-007		
	1120.30	1.31e-006	+ -1.50e-007		
	1764.50	1.33e-006	+ -1.37e-007		
Bi-212	727.17	6.64e-007	+ -2.26e-007	1.01e+000	1 of 4
K-40	1460.80	1.13e-005	+ -3.98e-007	1.12e+013	1 of 1
TOTAL:		1.64e-005	uCi/g		

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UNKNOWN PEAKS

Energy (keV)	Centroid Channel	Net Counts	Un- Certainty	C.L. Counts	Bkg. Counts	FWHM (keV)	Net Gamma/sec
87.19	346.35	118	53	102	817	0.48	1.028e+000
209.01	872.33	122	43	83	503	1.43	9.362e-001
270.12	1136.18	116	38	72	357	1.72	1.057e+000
463.01	1969.02	138	26	46	124	1.81	1.908e+000
860.72	3686.14	85	20	36	61	1.64	1.946e+000
933.86	4001.93	73	20	38	68	3.00	1.782e+000
1238.39	5316.80	76	23	45	92	1.63	2.353e+000
1377.44	5917.15	38	16	31	49	0.71	1.283e+000
1729.15	7435.71	45	11	19	16	2.96	1.839e+000

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GDR/PC RSSI High Resolution Gamma Spectroscopy Ver. 6.02a  
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Sample ID : 081945 PIONEER PESHTIGO SITE B-6

-----  
Sample Size . . . . . 7.15e+002 g | Spectrum File . . H:\MAESTROS\081945.CHN  
Sampling Start. . . . . 00-00-00 00:00 | Counting Start. . . . . 08-14-08 10:39  
Sampling Stop . . . . . 00-00-00 00:00 | Live Time . . . . . . . . . 3600 Sec  
Current Date. . . . . 00-00-00 00:00 | Real Time . . . . . . . . . 3605 Sec  
-----

Detector #: 1  
Energy(keV)= 6.97 + 0.232\*Ch + 0.00e+000\*Ch^2 + 0.00e+000\*Ch^3 07-21-08 11:19  
FWHM(keV) = 0.94 + 0.015\*En + 2.91e-004\*En^2 + 0.00e+000\*En^3 08-13-07 15:28  
Where En = Sqrt(Energy in keV)  
-----

Sensitivity . . . . . 0.20 | Search Start / End. . . . . 0 / 8191  
Sigma Multiplier. . . . . 1.00

#### PEAK SEARCH RESULTS

PK. #	ENERGY (keV)	ADDRESS CHANNEL	NET COUNTS	UN- CERTAINTY	C.L. COUNTS	BKG COUNTS	FWHM (keV)	FLAG
1	74.75	292.65	340	53	98	702	0.81	a
2	77.02	302.45	580	55	98	736	0.98	b
3	83.98	332.48	106	62	127	844	1.31	a NET < CL
4	87.19	346.35	216	58	112	788	1.03	b
5	93.01	371.48	295	57	108	800	1.70	
6	185.96	772.83	436	53	98	623	1.31	
7	238.71	1000.57	1493	58	88	446	1.05	a
8	241.72	1013.56	460	66	133	690	1.96	b
9	270.49	1137.77	74	41	81	386	0.68	NET < CL
10	295.24	1244.62	750	46	76	285	1.20	a
11	300.20	1266.06	66	24	43	169	0.64	b
12	328.33	1387.52	40	32	62	261	0.49	NET < CL
13	338.32	1430.63	281	34	60	235	0.97	
14	351.89	1489.23	1328	46	57	201	1.23	
15	463.23	1969.97	92	23	43	115	4.96	
16	510.72	2174.98	194	32	58	179	2.05	
17	583.41	2488.83	482	30	42	101	1.42	
18	609.38	2600.97	958	38	44	114	1.35	
19	665.55	2843.47	39	18	34	72	0.94	
20	727.27	3109.98	131	21	35	70	1.48	
21	768.37	3287.43	78	22	41	94	1.28	
22	795.02	3402.51	88	18	31	49	1.98	
23	861.04	3687.54	40	20	38	77	1.19	
24	911.30	3904.56	327	24	32	51	1.94	
25	933.84	4001.84	44	17	32	57	1.86	
26	964.60	4134.69	71	25	50	77	1.99	a
27	969.16	4154.36	187	20	31	50	1.54	b
28	1120.33	4807.05	233	22	33	55	1.61	
29	1238.44	5316.99	51	19	36	70	0.88	
30	1377.59	5917.80	58	10	15	11	1.49	

31	1408.19	6049.92	18	14	27	37	0.75	NET < CL
32	1460.86	6277.32	984	34	28	36	1.76	
33	1729.32	7436.44	40	10	16	12	1.93	
34	1764.37	7587.75	170	17	24	25	2.63	

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GDR/PC                    RSSI High Resolution Gamma Spectroscopy                    Ver. 6.02a  
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=====  
BACKGROUND SUBTRACT RESULTS  
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Sample ID :                081945 PIONEER PESHTIGO SITE B-6

-----  
Bkg File: . . . . H:\GDR\BKG\NOCAL.BKG | Counting Start. . . . . 08-14-08 10:39  
ID: . . . . . 24 Hour Background | Current Date . . . . . 00-00-00 00:00  
-----

PK#	ENERGY (keV)	FWHM (keV)	OLD NET COUNTS	OLD UN- CERTAINTY	NEW NET COUNTS	NEW UN- CERTAINTY	FLAG
1	74.75	0.81	340	53	286	53	
3	83.98	1.31	106	62	93	63	NET < CL
5	93.01	1.70	295	57	245	57	
6	185.96	1.31	436	53	407	54	
7	238.71	1.05	1493	58	1468	58	
10	295.24	1.20	750	46	721	46	
14	351.89	1.23	1328	46	1272	46	
16	510.72	2.05	194	32	107	32	
17	583.41	1.42	482	30	459	30	
18	609.38	1.35	958	38	864	38	
24	911.30	1.94	327	24	304	24	
27	969.16	1.54	187	20	175	21	
28	1120.33	1.61	233	22	217	22	
32	1460.86	1.76	984	34	799	34	
34	1764.37	2.63	170	17	150	17	

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GDR/PC RSSI High Resolution Gamma Spectroscopy Ver. 6.02a  
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NUCLIDE ACTIVITY SUMMARY

Sample ID: 081945 PIONEER PESHTIGO SITE B-6

-----  
Sample Size . . . . . 7.15e+002 g | Spectrum File . . H:\MAESTROS\081945.CHN  
Sampling Start. . . . . 00-00-00 00:00 | Counting Start. . . . . 08-14-08 10:39  
Sampling Stop . . . . . 00-00-00 00:00 | Buildup Time. . . . . 0.00e+000 Hrs  
Current Date. . . . . 00-00-00 00:00 | Decay Time [OFF]. . . . . 0.00e+000 Hrs  
-----

Efficiency File.H:\GDR\EFF\500MAR.EFF | Library File. . . . H:\GDR\LIB\1001.LIB  
ID. . . . . . . . . 500 MARINELLI | ID. . . . . . . TH, U, AND K SERIES  
-----

Eff.= 1/[2.90e-002\*En^-2.65e+000 + 9.35e+001\*En^8.20e-001] 02-19-08 12:00  
-----

Gamma Fraction Limit >= . . . 10.00 % | Decay Limit <=. . . 8.000 Halflives  
Library Energy Tolerance. . . 1.20  
-----

FINAL ACTIVITY REPORT

Nuclide	Energy (keV)	Conc +- 1.00sigma (uCi/g)	Halflife )	Peaks (hrs)	Peaks Found
Pb-212	Average:	1.03e-006	+ -4.07e-008	1.06e+001	4 of 4
	74.82		I.D.Only		
	77.11		I.D.Only		
	238.63	1.04e-006	+ -4.12e-008		
	300.09	7.21e-007	+ -2.63e-007		
Pb-214	Average:	1.43e-006	+ -4.46e-008	4.47e-001	4 of 4
	77.11		I.D.Only		
	241.98	1.44e-006	+ -2.83e-007		
	295.21	1.38e-006	+ -8.81e-008		
	351.92	1.44e-006	+ -5.26e-008		
Th-234	92.80		I.D.Only	5.78e+002	1 of 3
Ra-226	186.10		I.D.Only	1.40e+007	1 of 1
Ac-228	Average:	1.00e-006	+ -5.79e-008	6.13e+000	3 of 3
	338.32	1.01e-006	+ -1.24e-007		
	911.07	9.98e-007	+ -7.86e-008		
	969.11	1.01e-006	+ -1.18e-007		
Tl-208	Average:	3.40e-007	+ -2.19e-008	5.09e-002	2 of 3
	510.84	2.80e-007	+ -8.40e-008		
	583.14	3.44e-007	+ -2.27e-008		
Bi-214	Average:	1.27e-006	+ -4.83e-008	3.32e-001	4 of 4
	609.31	1.22e-006	+ -5.38e-008		
	768.36	1.22e-006	+ -3.45e-007		
	1120.30	1.54e-006	+ -1.58e-007		
	1764.50	1.48e-006	+ -1.72e-007		
Bi-212	727.17	1.47e-006	+ -2.30e-007	1.01e+000	1 of 4
K-40	1460.80	1.00e-005	+ -4.30e-007	1.12e+013	1 of 1
TOTAL:		1.66e-005	uCi/g		

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UNKNOWN PEAKS

Energy (keV)	Centroid Channel	Net Counts	Un- Certainty	C.L. Counts	Bkg. Counts	FWHM (keV)	Net Gamma/sec
87.19	346.35	216	58	112	788	1.03	1.875e+000
463.23	1969.97	92	23	43	115	4.96	1.283e+000
665.55	2843.47	39	18	34	72	0.94	7.263e-001
795.02	3402.51	88	18	31	49	1.98	1.895e+000
861.04	3687.54	40	20	38	77	1.19	9.194e-001
933.84	4001.84	44	17	32	57	1.86	1.089e+000
964.60	4134.69	71	25	50	77	1.99	1.779e+000
1238.44	5316.99	51	19	36	70	0.88	1.579e+000
1377.59	5917.80	58	10	15	11	1.49	1.946e+000
1729.32	7436.44	40	10	16	12	1.93	1.628e+000

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GDR/PC RSSI High Resolution Gamma Spectroscopy Ver. 6.02a  
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Sample ID : 081946 PIONEER PESHTIGO SITE B-8

-----  
Sample Size . . . . . 7.67e+002 g | Spectrum File . . H:\MAESTROS\081946.CHN  
Sampling Start. . . . . 00-00-00 00:00 | Counting Start. . . . . 08-14-08 11:43  
Sampling Stop . . . . . 00-00-00 00:00 | Live Time . . . . . . . . . 3600 Sec  
Current Date. . . . . 00-00-00 00:00 | Real Time . . . . . . . . . 3607 Sec  
-----

Detector #: 1

Energy(keV)= 6.97 + 0.232\*Ch + 0.00e+000\*Ch^2 + 0.00e+000\*Ch^3 07-21-08 11:19

FWHM(keV) = 0.94 + 0.015\*En + 2.91e-004\*En^2 + 0.00e+000\*En^3 08-13-07 15:28  
Where En = Sqrt(Energy in keV)

Sensitivity . . . . . 0.20 | Search Start / End. . . . . 0 / 8191  
Sigma Multiplier. . . . . 1.00

#### PEAK SEARCH RESULTS

PK. #	ENERGY (keV)	ADDRESS CHANNEL	NET COUNTS	UN- CERTAINTY	C.L. COUNTS	BKG COUNTS	FWHM (keV)	FLAG
1	63.05	242.12	234	60	113	945	1.21	
2	74.42	291.23	613	73	138	1249	0.99	a
3	76.66	300.91	1030	72	127	1220	0.99	b
4	86.83	344.79	183	68	130	1332	0.62	
5	92.40	368.86	580	70	130	1238	1.21	
6	185.72	771.77	814	68	121	1088	1.17	
7	238.43	999.34	1640	70	118	766	1.06	a
8	241.67	1013.34	1026	68	122	828	1.33	b
9	269.98	1135.58	212	57	113	672	2.00	
10	294.94	1243.36	2170	66	96	445	1.23	a
11	299.69	1263.84	87	30	56	251	0.71	b
12	327.76	1385.06	84	41	81	399	0.92	
13	337.99	1429.23	290	46	86	450	0.90	
14	351.64	1488.14	3521	71	80	390	1.29	
15	462.52	1966.88	89	32	63	228	1.04	
16	510.44	2173.79	229	35	65	230	1.95	
17	582.98	2486.99	583	37	57	180	1.38	
18	609.09	2599.73	2721	57	46	124	1.48	
19	665.30	2842.40	91	25	47	130	1.78	
20	727.05	3109.01	128	25	45	110	1.79	
21	768.14	3286.45	298	27	42	88	2.40	
22	785.88	3363.03	61	24	45	119	1.52	
23	795.09	3402.79	95	20	36	68	2.37	
24	806.11	3450.36	64	20	36	76	2.31	
25	860.81	3686.54	50	22	43	103	1.59	
26	911.01	3903.31	364	29	46	112	2.22	
27	933.49	4000.36	87	25	48	119	1.16	
28	968.80	4152.79	215	26	45	110	1.53	
29	1120.05	4805.84	511	32	46	104	1.58	
30	1154.58	4954.91	64	19	36	70	1.21	

31	1237.97	5314.95	206	24	41	84	1.53
32	1280.36	5498.01	75	16	27	37	1.96
33	1377.36	5916.82	173	19	29	37	2.03
34	1400.93	6018.58	60	18	34	38	1.98 a
35	1407.43	6046.64	75	21	42	49	2.28 b
36	1460.52	6275.86	850	34	35	56	2.18
37	1508.83	6484.45	86	18	33	48	3.58
38	1729.11	7435.50	79	14	24	27	1.75
39	1764.09	7586.55	462	25	25	26	2.45
40	1847.03	7944.65	80	11	14	9	1.64

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GDR/PC                    RSSI High Resolution Gamma Spectroscopy                    Ver. 6.02a  
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                          BACKGROUND SUBTRACT RESULTS  
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Sample ID :            081946 PIONEER PESHTIGO SITE B-8

Bkg File: . . . . H:\GDR\BKG\NOCAL.BKG | Counting Start. . . . . 08-14-08 11:43  
ID: . . . . . 24 Hour Background | Current Date . . . . . 00-00-00 00:00

PK#	ENERGY (keV)	FWHM (keV)	OLD NET COUNTS	OLD UN- CERTAINTY	NEW NET COUNTS	NEW UN- CERTAINTY	FLAG
2	74.42	0.99	613	73	575	73	
5	92.40	1.21	580	70	530	70	
6	185.72	1.17	814	68	785	68	
7	238.43	1.06	1640	70	1610	71	
10	294.94	1.23	2170	66	2147	66	
14	351.64	1.29	3521	71	3465	71	
16	510.44	1.95	229	35	142	35	
17	582.98	1.38	583	37	560	37	
18	609.09	1.48	2721	57	2627	57	
26	911.01	2.22	364	29	341	30	
28	968.80	1.53	215	26	203	26	
29	1120.05	1.58	511	32	495	32	
36	1460.52	2.18	850	34	665	34	
39	1764.09	2.45	462	25	442	25	

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GDR/PC RSSI High Resolution Gamma Spectroscopy Ver. 6.02a  
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NUCLIDE ACTIVITY SUMMARY

Sample ID: 081946 PIONEER PESHTIGO SITE B-8

-----  
Sample Size . . . . . 7.67e+002 g | Spectrum File . . H:\MAESTROS\081946.CHN  
Sampling Start. . . . . 00-00-00 00:00 | Counting Start. . . . . 08-14-08 11:43  
Sampling Stop . . . . . 00-00-00 00:00 | Buildup Time. . . . . 0.00e+000 Hrs  
Current Date. . . . . 00-00-00 00:00 | Decay Time [OFF]. . . . . 0.00e+000 Hrs  
-----

Efficiency File.H:\GDR\EFF\500MAR.EFF | Library File. . . . H:\GDR\LIB\1001.LIB  
ID. . . . . . . . . 500 MARINELLI | ID. . . . . . . TH, U, AND K SERIES  
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Eff.= 1/[2.90e-002\*En^-2.65e+000 + 9.35e+001\*En^8.20e-001] 02-19-08 12:00  
-----

Gamma Fraction Limit >= . . . 10.00 % | Decay Limit <=. . . 8.000 Halflives  
Library Energy Tolerance. . . 1.20  
-----

FINAL ACTIVITY REPORT

Nuclide	Energy (keV)	Conc +- 1.00sigma (uCi/g)	Halflife )	Peaks (hrs)	Peaks Found
Th-234	63.29	I.D.Only	5.78e+002	2 of	3
	92.80	I.D.Only			
Pb-212	Average:	1.06e-006 +-4.61e-008	1.06e+001	3 of	4
	74.82	I.D.Only			
	238.63	1.06e-006 +-4.66e-008			
	300.09	8.89e-007 +-3.07e-007			
Pb-214	Average:	3.71e-006 +-6.17e-008	4.47e-001	4 of	4
	77.11	I.D.Only			
	241.98	3.66e-006 +-2.70e-007			
	295.21	3.83e-006 +-1.17e-007			
	351.92	3.66e-006 +-7.54e-008			
Ra-226	186.10	I.D.Only	1.40e+007	1 of	1
Ac-228	Average:	1.04e-006 +-6.83e-008	6.13e+000	3 of	3
	338.32	9.73e-007 +-1.53e-007			
	911.07	1.04e-006 +-9.05e-008			
	969.11	1.09e-006 +-1.42e-007			
Tl-208	Average:	3.88e-007 +-2.48e-008	5.09e-002	2 of	3
	510.84	3.48e-007 +-8.66e-008			
	583.14	3.92e-007 +-2.59e-008			
Bi-214	Average:	3.53e-006 +-6.66e-008	3.32e-001	4 of	4
	609.31	3.46e-006 +-7.52e-008			
	768.36	4.36e-006 +-3.89e-007			
	1120.30	3.28e-006 +-2.11e-007			
	1764.50	4.07e-006 +-2.26e-007			
Bi-212	Average:	1.40e-006 +-2.54e-007	1.01e+000	2 of	4
	727.17	1.34e-006 +-2.57e-007			
	785.46	4.14e-006 +-1.62e-006			
K-40	1460.80	7.78e-006 +-3.95e-007	1.12e+013	1 of	1

TOTAL: 1.89e-005 uCi/g

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UNKNOWN PEAKS

Energy (keV)	Centroid Channel	Net Counts	Un- Certainty	C.L. Counts	Bkg. Counts	FWHM (keV)	Net Gamma/sec
86.83	344.79	183	68	130	1332	0.62	1.595e+000
269.98	1135.58	212	57	113	672	2.00	1.937e+000
327.76	1385.06	84	41	81	399	0.92	8.871e-001
462.52	1966.88	89	32	63	228	1.04	1.234e+000
665.30	2842.40	91	25	47	130	1.78	1.697e+000
795.09	3402.79	95	20	36	68	2.37	2.036e+000
806.11	3450.36	64	20	36	76	2.31	1.394e+000
860.81	3686.54	50	22	43	103	1.59	1.141e+000
933.49	4000.36	87	25	48	119	1.16	2.136e+000
1154.58	4954.91	64	19	36	70	1.21	1.870e+000
1237.97	5314.95	206	24	41	84	1.53	6.364e+000
1280.36	5498.01	75	16	27	37	1.96	2.396e+000
1377.36	5916.82	173	19	29	37	2.03	5.841e+000
1400.93	6018.58	60	18	34	38	1.98	2.052e+000
1407.43	6046.64	75	21	42	49	2.28	2.591e+000
1508.83	6484.45	86	18	33	48	3.58	3.132e+000
1729.11	7435.50	79	14	24	27	1.75	3.222e+000
1847.03	7944.65	80	11	14	9	1.64	3.451e+000

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GDR/PC RSSI High Resolution Gamma Spectroscopy Ver. 6.02a  
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Sample ID : 081946A PIONEER RE-RUN B-8 4-6 767.7g

-----  
Sample Size . . . . . 7.68e+002 g | Spectrum File . h:\maestros\081946A.chn  
Sampling Start. . . . . 00-00-00 00:00 | Counting Start. . . . . 10-28-08 16:22  
Sampling Stop . . . . . 00-00-00 00:00 | Live Time . . . . . . . . . 3600 Sec  
Current Date. . . . . 00-00-00 00:00 | Real Time . . . . . . . . . 3607 Sec  
-----

Detector #: 1

Energy(keV)= 6.68 + 0.231\*Ch + 5.01e-008\*Ch^2 + 0.00e+000\*Ch^3 10-28-08 09:11

FWHM(keV) = 0.94 + 0.015\*En + 2.91e-004\*En^2 + 0.00e+000\*En^3 08-13-07 15:28  
Where En = Sqrt(Energy in keV)

Sensitivity . . . . . 0.20 | Search Start / End. . . . . 0 / 8191  
Sigma Multiplier. . . . . 1.00

#### PEAK SEARCH RESULTS

PK. #	ENERGY (keV)	ADDRESS CHANNEL	NET COUNTS	UN- CERTAINTY	C.L. COUNTS	BKG COUNTS	FWHM (keV)	FLAG
1	62.33	240.65	119	59	113	1010	0.79	
2	74.09	291.49	616	70	131	1180	0.91	a
3	76.28	300.95	992	73	130	1265	0.95	b
4	83.30	331.31	113	65	128	1090	0.89	a NET < CL
5	86.38	344.63	400	69	132	1205	0.98	b
6	91.99	368.89	531	72	134	1315	1.34	
7	185.23	772.02	1025	70	123	1053	1.22	
8	208.41	872.23	167	57	110	843	1.23	
9	237.86	999.51	1750	73	124	805	1.09	a
10	241.11	1013.56	986	67	122	816	1.36	b
11	269.27	1135.31	256	50	95	555	1.64	
12	294.41	1243.94	2157	67	99	475	1.18	a
13	299.28	1264.98	91	42	84	409	1.13	b
14	337.55	1430.42	308	44	80	417	1.33	
15	351.06	1488.81	3772	72	74	354	1.39	
16	462.31	1969.52	195	32	59	186	1.40	
17	510.23	2176.58	261	36	66	228	2.03	
18	582.37	2488.23	534	38	61	212	1.17	
19	608.51	2601.13	2745	58	50	137	1.36	
20	664.86	2844.53	53	25	47	138	0.86	
21	726.41	3110.38	117	25	47	120	1.34	
22	767.61	3288.32	225	29	52	140	1.46	
23	785.18	3364.19	65	25	49	121	3.13	
24	794.50	3404.42	103	24	46	106	1.48	
25	805.49	3451.87	66	24	45	117	1.33	
26	838.92	3596.22	36	21	42	95	2.25	NET < CL
27	859.99	3687.19	70	21	39	89	3.53	
28	910.44	3905.00	398	30	45	109	1.88	
29	933.41	4004.16	118	25	45	109	1.08	
30	963.99	4136.20	61	24	47	93	1.45	a

31	968.35	4155.02	217	26	44	89	1.59	b
32	1119.67	4808.14	538	31	44	92	2.12	
33	1154.72	4959.36	73	19	35	64	1.57	
34	1237.80	5317.85	201	24	40	77	1.64	
35	1280.82	5503.48	73	20	37	65	1.94	
36	1377.42	5920.18	150	20	32	48	1.42	
37	1407.38	6049.41	67	17	31	42	2.29	
38	1460.72	6279.49	868	34	35	52	2.39	
39	1509.08	6488.00	81	16	28	38	1.70	
40	1630.66	7012.27	15	12	24	25	0.65	NET < CL
41	1729.93	7440.24	74	17	31	41	2.19	
42	1764.86	7590.81	437	24	24	25	1.90	
43	1847.93	7948.84	29	14	27	33	0.72	

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GDR/PC                    RSSI High Resolution Gamma Spectroscopy                    Ver. 6.02a  
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BACKGROUND SUBTRACT RESULTS  
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Sample ID :                081946A PIONEER RE-RUN B-8 4-6 767.7g

-----  
Bkg File: . . . . H:\GDR\BKG\NOCAL.BKG | Counting Start. . . . . 10-28-08 16:22  
ID: . . . . . 24 Hour Background | Current Date . . . . . 00-00-00 00:00  
-----

PK#	ENERGY (keV)	FWHM (keV)	OLD NET COUNTS	OLD UN- CERTAINTY	NEW NET COUNTS	NEW UN- CERTAINTY	FLAG
2	74.09	0.91	616	70	603	70	
6	91.99	1.34	531	72	481	72	
7	185.23	1.22	1025	70	1012	70	
9	237.86	1.09	1750	73	1734	73	
12	294.41	1.18	2157	67	2148	67	
15	351.06	1.39	3772	72	3752	72	
17	510.23	2.03	261	36	174	36	
18	582.37	1.17	534	38	526	38	
19	608.51	1.36	2745	58	2651	58	
28	910.44	1.88	398	30	375	30	
31	968.35	1.59	217	26	205	26	
32	1119.67	2.12	538	31	522	31	
38	1460.72	2.39	868	34	683	34	
42	1764.86	1.90	437	24	417	24	

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GDR/PC RSSI High Resolution Gamma Spectroscopy Ver. 6.02a  
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NUCLIDE ACTIVITY SUMMARY

Sample ID: 081946A PIONEER RE-RUN B-8 4-6 767.7g

-----  
Sample Size . . . . . 7.68e+002 g | Spectrum File . h:\maestros\081946A.chn  
Sampling Start. . . . . 00-00-00 00:00 | Counting Start. . . . . 10-28-08 16:22  
Sampling Stop . . . . . 00-00-00 00:00 | Buildup Time. . . . . 0.00e+000 Hrs  
Current Date. . . . . 00-00-00 00:00 | Decay Time [OFF]. . . . . 0.00e+000 Hrs  
-----

Efficiency File.H:\GDR\EFF\500MAR.EFF | Library File. . . . H:\GDR\LIB\1001.LIB  
ID. . . . . . . . . 500 MARINELLI | ID. . . . . . . TH, U, AND K SERIES  
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Eff.= 1/[2.90e-002\*En^-2.65e+000 + 9.35e+001\*En^8.20e-001] 02-19-08 12:00  
-----

Gamma Fraction Limit >= . . . 10.00 % | Decay Limit <=. . . 8.000 Halflives  
Library Energy Tolerance. . . 1.20  
-----

FINAL ACTIVITY REPORT

Nuclide	Energy (keV)	Conc +- 1.00sigma (uCi/g)	Halflife )	Peaks (hrs)	Peaks Found
Th-234	63.29	I.D.Only	5.78e+002	2 of	3
	92.80	I.D.Only			
Pb-212	Average:	1.14e-006 +-4.81e-008	1.06e+001	3 of	4
	74.82	I.D.Only			
	238.63	1.14e-006 +-4.84e-008			
	300.09	9.27e-007 +-4.32e-007			
Pb-214	Average:	3.92e-006 +-6.19e-008	4.47e-001	4 of	4
	77.11	I.D.Only			
	241.98	3.91e-006 +-2.67e-007			
	295.21	3.82e-006 +-1.19e-007			
	351.92	3.95e-006 +-7.55e-008			
Ra-226	186.10	I.D.Only	1.40e+007	1 of	1
Ac-228	Average:	1.11e-006 +-6.77e-008	6.13e+000	3 of	3
	338.32	1.03e-006 +-1.46e-007			
	911.07	1.15e-006 +-9.13e-008			
	969.11	1.10e-006 +-1.39e-007			
Tl-208	Average:	3.72e-007 +-2.53e-008	5.09e-002	2 of	3
	510.84	4.25e-007 +-8.90e-008			
	583.14	3.68e-007 +-2.64e-008			
Bi-214	Average:	3.52e-006 +-6.72e-008	3.32e-001	4 of	4
	609.31	3.49e-006 +-7.62e-008			
	768.36	3.29e-006 +-4.27e-007			
	1120.30	3.46e-006 +-2.08e-007			
	1764.50	3.84e-006 +-2.19e-007			
Bi-212	Average:	1.29e-006 +-2.60e-007	1.01e+000	2 of	4
	727.17	1.22e-006 +-2.63e-007			
	785.46	4.43e-006 +-1.71e-006			
K-40	1460.80	7.99e-006 +-3.98e-007	1.12e+013	1 of	1

TOTAL:

1.93e-005 uCi/g

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UNKNOWN PEAKS

Energy (keV)	Centroid Channel	Net Counts	Un- Certainty	C.L. Counts	Bkg. Counts	FWHM (keV)	Net Gamma/sec
86.38	344.63	400	69	132	1205	0.98	3.512e+000
208.41	872.23	167	57	110	843	1.23	1.287e+000
269.27	1135.31	256	50	95	555	1.64	2.334e+000
462.31	1969.52	195	32	59	186	1.40	2.695e+000
664.86	2844.53	53	25	47	138	0.86	9.862e-001
794.50	3404.42	103	24	46	106	1.48	2.210e+000
805.49	3451.87	66	24	45	117	1.33	1.433e+000
859.99	3687.19	70	21	39	89	3.53	1.615e+000
933.41	4004.16	118	25	45	109	1.08	2.887e+000
963.99	4136.20	61	24	47	93	1.45	1.548e+000
1154.72	4959.36	73	19	35	64	1.57	2.125e+000
1237.80	5317.85	201	24	40	77	1.64	6.230e+000
1280.82	5503.48	73	20	37	65	1.94	2.318e+000
1377.42	5920.18	150	20	32	48	1.42	5.066e+000
1407.38	6049.41	67	17	31	42	2.29	2.315e+000
1509.08	6488.00	81	16	28	38	1.70	2.936e+000
1729.94	7440.24	74	17	31	41	2.19	3.020e+000
1847.93	7948.84	29	14	27	33	0.72	1.232e+000

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GDR/PC RSSI High Resolution Gamma Spectroscopy Ver. 6.02a  
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Sample ID : 081947 PIONEER PESHTIGO SITE B-9

-----  
Sample Size . . . . . 6.88e+002 g | Spectrum File . . H:\MAESTROS\081947.CHN  
Sampling Start. . . . . 00-00-00 00:00 | Counting Start. . . . . 08-14-08 12:46  
Sampling Stop . . . . . 00-00-00 00:00 | Live Time . . . . . . . . . 3600 Sec  
Current Date. . . . . 00-00-00 00:00 | Real Time . . . . . . . . . 3605 Sec  
-----

Detector #: 1

Energy(keV)= 6.97 + 0.232\*Ch + 0.00e+000\*Ch^2 + 0.00e+000\*Ch^3 07-21-08 11:19

FWHM(keV) = 0.94 + 0.015\*En + 2.91e-004\*En^2 + 0.00e+000\*En^3 08-13-07 15:28  
Where En = Sqrt(Energy in keV)

Sensitivity . . . . . 0.20 | Search Start / End. . . . . 0 / 8191  
Sigma Multiplier. . . . . 1.00

#### PEAK SEARCH RESULTS

PK. #	ENERGY (keV)	ADDRESS CHANNEL	NET COUNTS	UN- CERTAINTY	C.L. COUNTS	BKG COUNTS	FWHM (keV)	FLAG
1	74.50	291.57	380	55	103	753	0.86	a
2	76.79	301.47	539	57	102	765	1.00	b
3	86.84	344.86	267	56	106	823	1.41	
4	92.54	369.48	358	55	101	748	1.94	
5	185.92	772.62	425	52	94	616	1.29	
6	209.04	872.46	103	41	78	485	0.79	
7	238.42	999.32	1654	65	105	547	1.19	a
8	241.52	1012.70	503	53	99	538	1.34	b
9	270.41	1137.44	102	41	80	390	1.52	
10	294.95	1243.38	911	47	74	276	1.19	a
11	299.82	1264.42	120	41	82	318	1.33	b
12	338.09	1429.63	266	33	57	221	0.91	
13	351.67	1488.30	1483	50	63	246	1.26	
14	409.07	1736.13	80	28	54	168	1.43	
15	462.48	1966.69	94	25	47	138	0.88	
16	510.60	2174.47	261	31	54	160	1.49	
17	582.98	2486.98	538	32	45	117	1.29	
18	609.12	2599.85	1121	42	51	149	1.39	
19	726.99	3108.78	110	21	36	76	1.14	
20	767.98	3285.74	105	22	40	82	1.48	
21	785.42	3361.02	56	16	29	48	1.07	
22	794.72	3401.18	50	19	36	81	1.45	
23	860.18	3683.82	57	18	35	63	0.96	
24	910.97	3903.10	290	26	41	88	1.67	
25	933.88	4002.02	73	16	28	43	2.73	
26	964.06	4132.35	60	20	40	62	1.63	a
27	968.75	4152.60	239	25	42	69	1.75	b
28	1120.02	4805.70	234	23	35	62	1.40	
29	1237.92	5314.76	113	16	24	30	2.32	
30	1377.39	5916.96	67	15	25	31	1.69	

31	1407.38	6046.43	31	13	24	27	2.33	
32	1460.55	6276.01	746	31	28	38	2.21	
33	1508.86	6484.58		25	12	25	0.92	
34	1587.51	6824.15		33	13	25	31	1.09
35	1729.29	7436.30		57	9	10	4	2.12
36	1764.22	7587.12		224	18	20	17	1.92

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GDR/PC                    RSSI High Resolution Gamma Spectroscopy                    Ver. 6.02a  
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=====  
BACKGROUND SUBTRACT RESULTS  
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Sample ID :        081947 PIONEER PESHTIGO SITE B-9

-----  
Bkg File: . . . . H:\GDR\BKG\NOCAL.BKG | Counting Start. . . . . 08-14-08 12:46  
ID: . . . . . 24 Hour Background | Current Date . . . . . 00-00-00 00:00  
-----

PK#	ENERGY (keV)	FWHM (keV)	OLD NET COUNTS	OLD UN- CERTAINTY	NEW NET COUNTS	NEW UN- CERTAINTY	FLAG
1	74.50	0.86	380	55	341	56	
4	92.54	1.94	358	55	308	55	
5	185.92	1.29	425	52	396	52	
7	238.42	1.19	1654	65	1623	65	
10	294.95	1.19	911	47	889	47	
13	351.67	1.26	1483	50	1427	50	
16	510.60	1.49	261	31	174	31	
17	582.98	1.29	538	32	515	32	
18	609.12	1.39	1121	42	1027	42	
24	910.97	1.67	290	26	267	26	
27	968.75	1.75	239	25	227	25	
28	1120.02	1.40	234	23	218	23	
32	1460.55	2.21	746	31	561	31	
36	1764.22	1.92	224	18	204	18	

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GDR/PC RSSI High Resolution Gamma Spectroscopy Ver. 6.02a  
=====

NUCLIDE ACTIVITY SUMMARY

Sample ID: 081947 PIONEER PESHTIGO SITE B-9

-----  
Sample Size . . . . . 6.88e+002 g | Spectrum File . . H:\MAESTROS\081947.CHN  
Sampling Start. . . . . 00-00-00 00:00 | Counting Start. . . . . 08-14-08 12:46  
Sampling Stop . . . . . 00-00-00 00:00 | Buildup Time. . . . . 0.00e+000 Hrs  
Current Date. . . . . 00-00-00 00:00 | Decay Time [OFF]. . . . . 0.00e+000 Hrs  
-----

Efficiency File.H:\GDR\EFF\500MAR.EFF | Library File. . . . H:\GDR\LIB\1001.LIB  
ID. . . . . . . . . 500 MARINELLI | ID. . . . . . . TH, U, AND K SERIES  
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Eff.= 1/[2.90e-002\*En^-2.65e+000 + 9.35e+001\*En^8.20e-001] 02-19-08 12:00  
-----

Gamma Fraction Limit >= . . . 10.00 % | Decay Limit <=. . . 8.000 Halflives  
Library Energy Tolerance. . . 1.20  
-----

FINAL ACTIVITY REPORT

Nuclide	Energy (keV)	Conc +- 1.00sigma (uCi/g)	Halflife )	Peaks (hrs)	Peaks Found
Pb-212	Average:	1.20e-006	+ -4.79e-008	1.06e+001	4 of 4
	74.82		I.D.Only		
	77.11		I.D.Only		
	238.63	1.20e-006	+ -4.81e-008		
	300.09	1.37e-006	+ -4.65e-007		
Pb-214	Average:	1.70e-006	+ -4.87e-008	4.47e-001	4 of 4
	77.11		I.D.Only		
	241.98	1.68e-006	+ -2.37e-007		
	295.21	1.77e-006	+ -9.36e-008		
	351.92	1.68e-006	+ -5.87e-008		
Th-234	92.80		I.D.Only	5.78e+002	1 of 3
Ra-226	186.10		I.D.Only	1.40e+007	1 of 1
Ra-224	240.98	1.04e-006	+ -4.49e-007	8.69e+001	1 of 1
Ac-228	Average:	1.02e-006	+ -6.54e-008	6.13e+000	3 of 3
	338.32	9.94e-007	+ -1.23e-007		
	911.07	9.10e-007	+ -8.96e-008		
	969.11	1.36e-006	+ -1.52e-007		
Tl-208	Average:	4.08e-007	+ -2.41e-008	5.09e-002	2 of 3
	510.84	4.76e-007	+ -8.55e-008		
	583.14	4.02e-007	+ -2.51e-008		
Bi-214	Average:	1.58e-006	+ -5.46e-008	3.32e-001	4 of 4
	609.31	1.51e-006	+ -6.16e-008		
	768.36	1.71e-006	+ -3.58e-007		
	1120.30	1.61e-006	+ -1.70e-007		
	1764.50	2.09e-006	+ -1.83e-007		
Bi-212	Average:	1.39e-006	+ -2.36e-007	1.01e+000	2 of 4
	727.17	1.28e-006	+ -2.41e-007		
	785.46	4.29e-006	+ -1.22e-006		

K-40 1460.80 7.31e-006 +-4.00e-007 1.12e+013 1 of 1

TOTAL: 1.57e-005 uCi/g

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UNKNOWN PEAKS

Energy (keV)	Centroid Channel	Net Counts	Un- Certainty	C.L. Counts	Bkg. Counts	FWHM (keV)	Net Gamma/sec
86.84	344.86	267	56	106	823	1.41	2.327e+000
209.04	872.46	103	41	78	485	0.79	7.911e-001
270.41	1137.44	102	41	80	390	1.52	9.328e-001
409.07	1736.13	80	28	54	168	1.43	1.007e+000
462.48	1966.69	94	25	47	138	0.88	1.303e+000
794.72	3401.18	50	19	36	81	1.45	1.076e+000
860.18	3683.82	57	18	35	63	0.96	1.309e+000
933.88	4002.02	73	16	28	43	2.73	1.785e+000
964.06	4132.35	60	20	40	62	1.63	1.510e+000
1237.92	5314.76	113	16	24	30	2.32	3.496e+000
1377.39	5916.96	67	15	25	31	1.69	2.274e+000
1407.38	6046.43	31	13	24	27	2.33	1.071e+000
1508.86	6484.58	25	12	22	25	0.92	8.917e-001
1587.51	6824.15	33	13	25	31	1.09	1.265e+000
1729.29	7436.30	57	9	10	4	2.12	2.305e+000

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GDR/PC RSSI High Resolution Gamma Spectroscopy Ver. 6.02a  
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Sample ID : 081948 PIONEER PESHTIGO SITE B-10

-----  
Sample Size . . . . . 7.00e+002 g | Spectrum File . . H:\MAESTROS\081948.CHN  
Sampling Start. . . . . 00-00-00 00:00 | Counting Start. . . . . 08-14-08 14:59  
Sampling Stop . . . . . 00-00-00 00:00 | Live Time . . . . . . . . . 3600 Sec  
Current Date. . . . . 00-00-00 00:00 | Real Time . . . . . . . . . 3605 Sec  
-----

Detector #: 1

Energy(keV)= 6.97 + 0.232\*Ch + 0.00e+000\*Ch^2 + 0.00e+000\*Ch^3 07-21-08 11:19

FWHM(keV) = 0.94 + 0.015\*En + 2.91e-004\*En^2 + 0.00e+000\*En^3 08-13-07 15:28  
Where En = Sqrt(Energy in keV)

Sensitivity . . . . . 0.20 | Search Start / End. . . . . 0 / 8191  
Sigma Multiplier. . . . . 1.00

#### PEAK SEARCH RESULTS

PK. #	ENERGY (keV)	ADDRESS CHANNEL	NET COUNTS	UN- CERTAINTY	C.L. COUNTS	BKG COUNTS	FWHM (keV)	FLAG
1	74.50	291.58	347	61	117	825	0.93	a
2	76.81	301.56	564	52	90	659	0.87	b
3	83.97	332.45	100	45	85	566	0.77	a
4	86.98	345.45	192	58	115	811	1.03	b
5	92.60	369.71	284	57	108	811	1.97	
6	185.86	772.36	469	51	92	579	1.74	
7	209.07	872.58	179	50	98	591	1.34	
8	238.48	999.55	1680	62	96	486	1.17	a
9	241.58	1012.97	495	55	104	552	1.41	b
10	270.40	1137.38	102	40	78	375	1.15	
11	295.06	1243.84	849	45	70	265	1.13	a
12	299.68	1263.81	73	29	55	225	0.82	b
13	327.62	1384.44	82	32	61	238	1.00	
14	338.13	1429.80	326	37	64	255	0.97	
15	351.73	1488.53	1423	47	55	198	1.35	
16	462.64	1967.39	86	26	48	150	1.23	
17	510.54	2174.23	234	29	50	156	1.63	
18	582.98	2486.98	524	30	40	90	1.64	
19	609.07	2599.64	1066	38	40	95	1.81	
20	727.36	3110.38	147	23	39	77	2.56	
21	767.99	3285.79	115	22	40	73	1.95	
22	785.88	3363.01	41	20	38	76	1.49	
23	794.98	3402.31	57	20	37	70	1.14	
24	860.14	3683.63	30	20	38	90	0.82	NET < CL
25	910.95	3903.01	347	25	35	63	1.68	
26	933.95	4002.32	42	16	29	51	2.85	
27	964.74	4135.28	60	21	42	61	2.23	a
28	968.70	4152.36	207	22	34	51	1.40	b
29	1120.02	4805.71	254	20	26	33	2.01	
30	1238.05	5315.32	79	17	31	48	4.49	

31	1377.25	5916.33	70	13	21	20	1.66
32	1460.40	6275.33	745	30	25	28	2.16
33	1630.85	7011.29	24	10	17	11	2.00
34	1729.34	7436.50	35	11	20	19	1.47
35	1764.00	7586.16	177	16	19	16	1.80

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GDR/PC                    RSSI High Resolution Gamma Spectroscopy                    Ver. 6.02a  
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=====  
BACKGROUND SUBTRACT RESULTS  
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Sample ID :                081948 PIONEER PESHTIGO SITE B-10

-----  
Bkg File: . . . . H:\GDR\BKG\NOCAL.BKG | Counting Start. . . . . 08-14-08 14:59  
ID: . . . . . 24 Hour Background | Current Date . . . . . 00-00-00 00:00  
-----

PK#	ENERGY (keV)	FWHM (keV)	OLD NET COUNTS	OLD UN- CERTAINTY	NEW NET COUNTS	NEW UN- CERTAINTY	FLAG
1	74.50	0.93	347	61	306	61	
3	83.97	0.77	100	45	93	45	
5	92.60	1.97	284	57	234	57	
6	185.86	1.74	469	51	440	51	
8	238.48	1.17	1680	62	1648	62	
11	295.06	1.13	849	45	825	45	
15	351.73	1.35	1423	47	1367	47	
17	510.54	1.63	234	29	147	30	
18	582.98	1.64	524	30	501	30	
19	609.07	1.81	1066	38	972	38	
25	910.95	1.68	347	25	324	25	
28	968.70	1.40	207	22	195	22	
29	1120.02	2.01	254	20	238	20	
32	1460.40	2.16	745	30	560	30	
35	1764.00	1.80	177	16	157	16	

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GDR/PC RSSI High Resolution Gamma Spectroscopy Ver. 6.02a  
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NUCLIDE ACTIVITY SUMMARY

Sample ID: 081948 PIONEER PESHTIGO SITE B-10

-----  
Sample Size . . . . . 7.00e+002 g | Spectrum File . . H:\MAESTROS\081948.CHN  
Sampling Start. . . . . 00-00-00 00:00 | Counting Start. . . . . 08-14-08 14:59  
Sampling Stop . . . . . 00-00-00 00:00 | Buildup Time. . . . . 0.00e+000 Hrs  
Current Date. . . . . 00-00-00 00:00 | Decay Time [OFF]. . . . . 0.00e+000 Hrs  
-----

Efficiency File.H:\GDR\EFF\500MAR.EFF | Library File. . . . H:\GDR\LIB\1001.LIB  
ID. . . . . . . . . 500 MARINELLI | ID. . . . . . . TH, U, AND K SERIES  
-----

Eff.= 1/[2.90e-002\*En^-2.65e+000 + 9.35e+001\*En^8.20e-001] 02-19-08 12:00  
-----

Gamma Fraction Limit >= . . . 10.00 % | Decay Limit <=. . . 8.000 Halflives  
Library Energy Tolerance. . . 1.20  
-----

FINAL ACTIVITY REPORT

Nuclide	Energy (keV)	Conc +- 1.00sigma (uCi/g)	Halflife )	Peaks (hrs)	Peaks Found
Pb-212	Average:	1.19e-006	+ -4.47e-008	1.06e+001	4 of 4
	74.82		I.D.Only		
	77.11		I.D.Only		
	238.63	1.19e-006	+ -4.51e-008		
	300.09	8.20e-007	+ -3.25e-007		
Pb-214	Average:	1.59e-006	+ -4.54e-008	4.47e-001	4 of 4
	77.11		I.D.Only		
	241.98	1.58e-006	+ -2.40e-007		
	295.21	1.61e-006	+ -8.81e-008		
	351.92	1.58e-006	+ -5.43e-008		
Th-228	84.37		I.D.Only	1.68e+004	1 of 2
Th-234	92.80		I.D.Only	5.78e+002	1 of 3
Ra-226	186.10		I.D.Only	1.40e+007	1 of 1
Ra-224	240.98	1.09e-006	+ -4.55e-007	8.69e+001	1 of 1
Ac-228	Average:	1.13e-006	+ -6.26e-008	6.13e+000	3 of 3
	338.32	1.20e-006	+ -1.35e-007		
	911.07	1.09e-006	+ -8.48e-008		
	969.11	1.15e-006	+ -1.28e-007		
Tl-208	Average:	3.85e-007	+ -2.23e-008	5.09e-002	2 of 3
	510.84	3.95e-007	+ -7.97e-008		
	583.14	3.84e-007	+ -2.33e-008		
Bi-214	Average:	1.47e-006	+ -4.90e-008	3.32e-001	4 of 4
	609.31	1.40e-006	+ -5.55e-008		
	768.36	1.85e-006	+ -3.50e-007		
	1120.30	1.73e-006	+ -1.48e-007		
	1764.50	1.58e-006	+ -1.62e-007		
Bi-212	Average:	1.72e-006	+ -2.54e-007	1.01e+000	2 of 4
	727.17	1.68e-006	+ -2.58e-007		

K-40            785.46     3.05e-006 +-1.47e-006  
              1460.80    7.18e-006 +-3.84e-007 1.12e+013      1 of    1

TOTAL:            1.57e-005 uCi/g

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UNKNOWN PEAKS

Energy (keV)	Centroid Channel	Net Counts	Un- Certainty	C.L. Counts	Bkg. Counts	FWHM (keV)	Net Gamma/sec
86.98	345.45	192	58	115	811	1.03	1.674e+000
209.07	872.58	179	50	98	591	1.34	1.379e+000
270.40	1137.38	102	40	78	375	1.15	9.328e-001
327.62	1384.44	82	32	61	238	1.00	8.657e-001
462.64	1967.39	86	26	48	150	1.23	1.190e+000
794.98	3402.31	57	20	37	70	1.14	1.235e+000
933.95	4002.32	42	16	29	51	2.85	1.032e+000
964.74	4135.28	60	21	42	61	2.23	1.525e+000
1238.05	5315.32	79	17	31	48	4.49	2.448e+000
1377.25	5916.33	70	13	21	20	1.66	2.354e+000
1630.85	7011.29	24	10	17	11	2.00	9.176e-001
1729.34	7436.50	35	11	20	19	1.47	1.424e+000

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GDR/PC RSSI High Resolution Gamma Spectroscopy Ver. 6.02a  
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Sample ID : 081949 PIONEET PESHTIGO SITE B-11

-----  
Sample Size . . . . . 7.49e+002 g | Spectrum File . . H:\MAESTROS\081949.CHN  
Sampling Start. . . . . 00-00-00 00:00 | Counting Start. . . . . 08-14-08 16:00  
Sampling Stop . . . . . 00-00-00 00:00 | Live Time . . . . . . . . . 3600 Sec  
Current Date. . . . . 00-00-00 00:00 | Real Time . . . . . . . . . 3604 Sec  
-----

Detector #: 1  
Energy(keV)= 6.97 + 0.232\*Ch + 0.00e+000\*Ch^2 + 0.00e+000\*Ch^3 07-21-08 11:19  
FWHM(keV) = 0.94 + 0.015\*En + 2.91e-004\*En^2 + 0.00e+000\*En^3 08-13-07 15:28  
Where En = Sqrt(Energy in keV)  
-----

Sensitivity . . . . . 0.20 | Search Start / End. . . . . 0 / 8191  
Sigma Multiplier. . . . . 1.00

#### PEAK SEARCH RESULTS

PK. #	ENERGY (keV)	ADDRESS CHANNEL	NET COUNTS	UN- CERTAINTY	C.L. COUNTS	BKG COUNTS	FWHM (keV)	FLAG
1	74.32	290.81	211	51	97	677	0.83	a
2	76.66	300.88	443	55	100	762	0.98	b
3	86.81	344.73	200	49	91	658	0.97	
4	92.38	368.78	254	52	97	698	1.51	
5	185.49	770.77	543	51	91	513	1.88	
6	208.88	871.76	86	42	81	488	0.95	
7	238.29	998.73	1127	55	90	442	1.10	a
8	241.33	1011.86	370	50	95	483	1.32	b
9	270.05	1135.87	102	36	70	317	2.14	
10	294.82	1242.81	718	46	78	279	1.30	a
11	299.80	1264.35	68	27	50	182	0.83	b
12	337.97	1429.14	265	33	56	207	1.45	
13	351.53	1487.68	1270	45	56	192	1.24	
14	462.54	1966.99	72	23	43	114	2.04	
15	510.56	2174.31	206	29	51	152	1.55	
16	582.84	2486.40	404	28	40	87	1.58	
17	608.93	2599.04	954	37	40	95	1.45	
18	726.80	3107.95	67	21	39	89	1.30	
19	768.35	3287.32	68	21	40	90	1.40	
20	795.02	3402.48	45	19	36	67	1.24	
21	860.15	3683.70	36	17	31	60	1.38	
22	910.77	3902.28	257	24	36	67	1.37	
23	933.42	4000.05	48	16	29	48	1.60	
24	964.24	4133.14	53	20	39	57	1.57	a
25	968.61	4151.97	165	23	40	64	1.88	b
26	1119.84	4804.92	170	21	33	54	2.10	
27	1237.87	5314.53	66	19	35	62	2.32	
28	1377.45	5917.19	54	11	17	15	2.73	
29	1460.18	6274.39	862	31	21	20	2.10	
30	1729.13	7435.61	37	9	14	9	2.21	

31 1763.97 7586.05 139 15 20 17 1.65

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GDR/PC                    RSSI High Resolution Gamma Spectroscopy                    Ver. 6.02a  
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=====  
BACKGROUND SUBTRACT RESULTS  
=====

Sample ID :        081949 PIONEET PESHTIGO SITE B-11

-----  
Bkg File: . . . . H:\GDR\BKG\NOCAL.BKG | Counting Start. . . . . 08-14-08 16:00  
ID: . . . . . 24 Hour Background | Current Date . . . . . 00-00-00 00:00  
-----

PK#	ENERGY (keV)	FWHM (keV)	OLD NET COUNTS	OLD UN- CERTAINTY	NEW NET COUNTS	NEW UN- CERTAINTY	FLAG
1	74.32	0.83	211	51	185	51	
4	92.38	1.51	254	52	204	52	
5	185.49	1.88	543	51	514	51	
7	238.29	1.10	1127	55	1100	56	
10	294.82	1.30	718	46	697	46	
13	351.53	1.24	1270	45	1214	45	
15	510.56	1.55	206	29	119	29	
16	582.84	1.58	404	28	381	28	
17	608.93	1.45	954	37	860	37	
22	910.77	1.37	257	24	234	24	
25	968.61	1.88	165	23	153	23	
26	1119.84	2.10	170	21	154	21	
29	1460.18	2.10	862	31	677	31	
31	1763.97	1.65	139	15	119	15	

=====  
GDR/PC RSSI High Resolution Gamma Spectroscopy Ver. 6.02a  
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NUCLIDE ACTIVITY SUMMARY

Sample ID: 081949 PIONEET PESHTIGO SITE B-11

-----  
Sample Size . . . . . 7.49e+002 g | Spectrum File . . H:\MAESTROS\081949.CHN  
Sampling Start. . . . . 00-00-00 00:00 | Counting Start. . . . . 08-14-08 16:00  
Sampling Stop . . . . . 00-00-00 00:00 | Buildup Time. . . . . 0.00e+000 Hrs  
Current Date. . . . . 00-00-00 00:00 | Decay Time [OFF]. . . . . 0.00e+000 Hrs  
-----

Efficiency File.H:\GDR\EFF\500MAR.EFF | Library File. . . . H:\GDR\LIB\1001.LIB  
ID. . . . . . . . . 500 MARINELLI | ID. . . . . . . TH, U, AND K SERIES  
-----

Eff.= 1/[2.90e-002\*En^-2.65e+000 + 9.35e+001\*En^8.20e-001] 02-19-08 12:00  
-----

Gamma Fraction Limit >= . . . 10.00 % | Decay Limit <=. . . 8.000 Halflives  
Library Energy Tolerance. . . 1.20  
-----

FINAL ACTIVITY REPORT

Nuclide	Energy (keV)	Conc +- 1.00sigma (uCi/g)	Halflife )	Peaks (hrs)	Peaks Found
Pb-212	Average:	7.44e-007	+ -3.72e-008	1.06e+001	4 of 4
	74.82		I.D.Only		
	77.11		I.D.Only		
	238.63	7.45e-007	+ -3.76e-008		
	300.09	7.09e-007	+ -2.79e-007		
Pb-214	Average:	1.30e-006	+ -4.15e-008	4.47e-001	4 of 4
	77.11		I.D.Only		
	241.98	1.31e-006	+ -2.04e-007		
	295.21	1.27e-006	+ -8.42e-008		
	351.92	1.31e-006	+ -4.90e-008		
Th-234	92.80		I.D.Only	5.78e+002	1 of 3
Ra-226	186.10		I.D.Only	1.40e+007	1 of 1
Ac-228	Average:	7.97e-007	+ -5.56e-008	6.13e+000	3 of 3
	338.32	9.11e-007	+ -1.12e-007		
	911.07	7.32e-007	+ -7.43e-008		
	969.11	8.40e-007	+ -1.27e-007		
Tl-208	Average:	2.75e-007	+ -1.94e-008	5.09e-002	2 of 3
	510.84	2.99e-007	+ -7.37e-008		
	583.14	2.73e-007	+ -2.01e-008		
Bi-214	Average:	1.14e-006	+ -4.42e-008	3.32e-001	4 of 4
	609.31	1.16e-006	+ -4.98e-008		
	768.36	1.02e-006	+ -3.21e-007		
	1120.30	1.04e-006	+ -1.41e-007		
	1764.50	1.12e-006	+ -1.44e-007		
Bi-212	727.17	7.20e-007	+ -2.24e-007	1.01e+000	1 of 4
K-40	1460.80	8.11e-006	+ -3.74e-007	1.12e+013	1 of 1
TOTAL:		1.31e-005	uCi/g		

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UNKNOWN PEAKS

Energy (keV)	Centroid Channel	Net Counts	Un- Certainty	C.L. Counts	Bkg. Counts	FWHM (keV)	Net Gamma/sec
86.81	344.73	200	49	91	658	0.97	1.747e+000
208.88	871.76	86	42	81	488	0.95	6.586e-001
270.05	1135.87	102	36	70	317	2.14	9.288e-001
462.54	1966.99	72	23	43	114	2.04	9.982e-001
795.02	3402.48	45	19	36	67	1.24	9.582e-001
860.15	3683.71	36	17	31	60	1.38	8.268e-001
933.42	4000.04	48	16	29	48	1.60	1.166e+000
964.24	4133.14	53	20	39	57	1.57	1.329e+000
1237.87	5314.54	66	19	35	62	2.32	2.032e+000
1377.45	5917.19	54	11	17	15	2.73	1.835e+000
1729.13	7435.61	37	9	14	9	2.21	1.519e+000

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GDR/PC RSSI High Resolution Gamma Spectroscopy Ver. 6.02a  
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Sample ID : 081950 PIONEER PESHTIGO SITE B-12

-----  
Sample Size . . . . . 7.04e+002 g | Spectrum File . . H:\MAESTROS\081950.CHN  
Sampling Start. . . . . 00-00-00 00:00 | Counting Start. . . . . 08-12-08 17:41  
Sampling Stop . . . . . 00-00-00 00:00 | Live Time . . . . . . . . . 3600 Sec  
Current Date. . . . . 00-00-00 00:00 | Real Time . . . . . . . . . 3604 Sec  
-----

Detector #: 1

Energy(keV)= 6.97 + 0.232\*Ch + 0.00e+000\*Ch^2 + 0.00e+000\*Ch^3 07-21-08 11:19

FWHM(keV) = 0.94 + 0.015\*En + 2.91e-004\*En^2 + 0.00e+000\*En^3 08-13-07 15:28  
Where En = Sqrt(Energy in keV)

Sensitivity . . . . . 0.20 | Search Start / End. . . . . 0 / 8191  
Sigma Multiplier. . . . . 1.00

#### PEAK SEARCH RESULTS

PK. #	ENERGY (keV)	ADDRESS CHANNEL	NET COUNTS	UN- CERTAINTY	C.L. COUNTS	BKG COUNTS	FWHM (keV)	FLAG
1	63.39	243.60	80	48	94	611	0.77	NET < CL
2	74.81	292.91	382	61	118	781	1.15	a
3	76.95	302.17	554	52	92	630	0.97	b
4	87.13	346.10	87	51	97	747	0.62	NET < CL
5	92.67	370.03	310	51	92	674	1.64	
6	186.01	773.01	480	50	90	557	1.32	
7	238.53	999.81	1261	58	95	456	1.17	a
8	241.69	1013.42	466	53	99	496	1.50	b
9	269.82	1134.89	100	42	83	377	1.55	
10	277.24	1166.91	78	35	68	303	1.20	
11	295.10	1244.05	833	46	74	253	1.30	a
12	300.07	1265.48	85	38	76	267	1.40	b
13	327.80	1385.24	65	33	64	252	1.79	
14	338.12	1429.79	261	31	54	190	1.12	
15	351.81	1488.90	1364	46	54	190	1.34	
16	462.69	1967.63	58	22	42	113	1.71	
17	510.74	2175.09	214	28	49	127	1.97	
18	583.03	2487.21	363	29	44	120	1.35	
19	609.19	2600.16	1017	38	43	100	1.57	
20	727.14	3109.43	77	21	38	81	1.05	
21	768.33	3287.26	39	23	44	120	0.82	NET < CL
22	794.30	3399.40	72	18	33	56	4.58	
23	911.05	3903.48	278	23	34	63	1.74	
24	933.73	4001.39	51	15	28	42	1.39	
25	964.38	4133.73	69	21	42	61	1.60	a
26	968.83	4152.92	132	19	33	51	1.58	b
27	1119.96	4805.44	209	24	40	77	1.21	
28	1237.94	5314.85	106	17	27	39	1.74	
29	1376.89	5914.77	65	13	21	20	1.97	
30	1460.34	6275.10	796	31	26	31	2.52	

31	1729.27	7436.19	44	9	14	8	5.64
32	1763.97	7586.03	180	18	27	30	1.97
33	1846.76	7943.48	16	8	15	11	0.81

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GDR/PC                    RSSI High Resolution Gamma Spectroscopy                    Ver. 6.02a  
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=====  
BACKGROUND SUBTRACT RESULTS  
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Sample ID :                081950 PIONEER PESHTIGO SITE B-12

-----  
Bkg File: . . . . H:\GDR\BKG\NOCAL.BKG | Counting Start. . . . . 08-12-08 17:41  
ID: . . . . . 24 Hour Background | Current Date . . . . . 00-00-00 00:00  
-----

PK#	ENERGY (keV)	FWHM (keV)	OLD NET COUNTS	OLD UN- CERTAINTY	NEW NET COUNTS	NEW UN- CERTAINTY	FLAG
2	74.81	1.15	382	61	313	61	
5	92.67	1.64	310	51	260	51	
6	186.01	1.32	480	50	451	51	
7	238.53	1.17	1261	58	1230	58	
11	295.10	1.30	833	46	806	46	
15	351.81	1.34	1364	46	1308	46	
17	510.74	1.97	214	28	127	28	
18	583.03	1.35	363	29	340	29	
19	609.19	1.57	1017	38	923	38	
23	911.05	1.74	278	23	255	24	
26	968.83	1.58	132	19	120	20	
27	1119.96	1.21	209	24	193	24	
30	1460.34	2.52	796	31	611	31	
32	1763.97	1.97	180	18	160	19	

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GDR/PC RSSI High Resolution Gamma Spectroscopy Ver. 6.02a  
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NUCLIDE ACTIVITY SUMMARY

Sample ID: 081950 PIONEER PESHTIGO SITE B-12

-----  
Sample Size . . . . . 7.04e+002 g | Spectrum File . . H:\MAESTROS\081950.CHN  
Sampling Start. . . . . 00-00-00 00:00 | Counting Start. . . . . 08-12-08 17:41  
Sampling Stop . . . . . 00-00-00 00:00 | Buildup Time. . . . . 0.00e+000 Hrs  
Current Date. . . . . 00-00-00 00:00 | Decay Time [OFF]. . . . . 0.00e+000 Hrs  
-----

Efficiency File.H:\GDR\EFF\500MAR.EFF | Library File. . . . H:\GDR\LIB\1001.LIB  
ID. . . . . . . . . 500 MARINELLI | ID. . . . . . . TH, U, AND K SERIES  
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Eff.= 1/[2.90e-002\*En^-2.65e+000 + 9.35e+001\*En^8.20e-001] 02-19-08 12:00  
-----

Gamma Fraction Limit >= . . . 10.00 % | Decay Limit <=. . . 8.000 Halflives  
Library Energy Tolerance. . . 1.20  
-----

FINAL ACTIVITY REPORT

Nuclide	Energy (keV)	Conc +- 1.00sigma (uCi/g)	Halflife )	Peaks (hrs)	Peaks Found
Pb-212	Average:	8.87e-007	+ -4.17e-008	1.06e+001	4 of 4
	74.82		I.D.Only		
	77.11		I.D.Only		
	238.63	8.86e-007	+ -4.19e-008		
	300.09	9.46e-007	+ -4.18e-007		
Pb-214	Average:	1.52e-006	+ -4.46e-008	4.47e-001	4 of 4
	77.11		I.D.Only		
	241.98	1.51e-006	+ -2.28e-007		
	295.21	1.57e-006	+ -8.91e-008		
	351.92	1.51e-006	+ -5.29e-008		
Th-234	92.80		I.D.Only	5.78e+002	1 of 3
Ra-226	186.10		I.D.Only	1.40e+007	1 of 1
Ra-224	240.98	9.70e-007	+ -4.32e-007	8.69e+001	1 of 1
Tl-208	Average:	2.67e-007	+ -2.12e-008	5.09e-002	3 of 3
	277.35	4.10e-007	+ -1.85e-007		
	510.84	3.39e-007	+ -7.54e-008		
	583.14	2.59e-007	+ -2.22e-008		
Ac-228	Average:	8.39e-007	+ -5.66e-008	6.13e+000	3 of 3
	338.32	9.55e-007	+ -1.15e-007		
	911.07	8.50e-007	+ -7.88e-008		
	969.11	6.99e-007	+ -1.15e-007		
Bi-214	Average:	1.35e-006	+ -5.04e-008	3.32e-001	3 of 4
	609.31	1.33e-006	+ -5.49e-008		
	1120.30	1.40e-006	+ -1.75e-007		
	1764.50	1.60e-006	+ -1.86e-007		
Bi-212	727.17	8.73e-007	+ -2.35e-007	1.01e+000	1 of 4
K-40	1460.80	7.78e-006	+ -3.96e-007	1.12e+013	1 of 1

TOTAL: 1.45e-005 uCi/g

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UNKNOWN PEAKS

Energy (keV)	Centroid Channel	Net Counts	Un- Certainty	C.L. Counts	Bkg. Counts	FWHM (keV)	Net Gamma/sec
269.82	1134.89	100	42	83	377	1.55	9.161e-001
327.80	1385.24	65	33	64	252	1.79	6.865e-001
462.69	1967.63	58	22	42	113	1.71	7.997e-001
794.30	3399.40	72	18	33	56	4.58	1.549e+000
933.73	4001.39	51	15	28	42	1.39	1.253e+000
964.38	4133.73	69	21	42	61	1.60	1.739e+000
1237.94	5314.85	106	17	27	39	1.74	3.265e+000
1376.89	5914.77	65	13	21	20	1.97	2.195e+000
1729.27	7436.19	44	9	14	8	5.64	1.786e+000
1846.76	7943.48	16	8	15	11	0.81	7.079e-001

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GDR/PC RSSI High Resolution Gamma Spectroscopy Ver. 6.02a  
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Sample ID : 082400 PIONEER B-13 2-4 539.5

-----  
Sample Size . . . . . 5.40e+002 g | Spectrum File . . H:\maestros\082400.chn  
Sampling Start. . . . . 00-00-00 00:00 | Counting Start. . . . . 10-16-08 11:14  
Sampling Stop . . . . . 00-00-00 00:00 | Live Time . . . . . . . . . 3600 Sec  
Current Date. . . . . 00-00-00 00:00 | Real Time . . . . . . . . . 3604 Sec  
-----

Detector #: 1

Energy(keV)= 7.26 + 0.231\*Ch + 3.28e-008\*Ch^2 + 0.00e+000\*Ch^3 10-16-08 10:31

FWHM(keV) = 0.94 + 0.015\*En + 2.91e-004\*En^2 + 0.00e+000\*En^3 08-13-07 15:28  
Where En = Sqrt(Energy in keV)

Sensitivity . . . . . 0.20 | Search Start / End. . . . . 0 / 8191  
Sigma Multiplier. . . . . 1.00

#### PEAK SEARCH RESULTS

PK. #	ENERGY (keV)	ADDRESS CHANNEL	NET COUNTS	UN- CERTAINTY	C.L. COUNTS	BKG COUNTS	FWHM (keV)	FLAG
1	74.85	292.38	294	51	96	594	0.94	a
2	77.09	302.09	319	43	76	490	0.83	b
3	87.19	345.77	106	39	72	478	1.09	
4	92.79	370.00	209	46	86	548	1.09	
5	185.75	772.04	314	43	78	421	1.14	
6	209.02	872.70	168	41	79	387	1.33	
7	238.59	1000.59	1034	56	94	448	1.21	a
8	241.76	1014.28	291	45	84	413	1.25	b
9	270.48	1138.48	64	36	71	291	1.30	NET < CL
10	295.09	1244.92	596	40	66	223	1.18	a
11	300.14	1266.73	37	22	41	142	0.64	b NET < CL
12	338.08	1430.80	208	32	57	198	1.41	
13	351.81	1490.17	1061	43	55	189	1.31	
14	462.70	1969.61	73	21	38	89	1.44	
15	510.87	2177.88	190	28	51	137	3.58	
16	583.11	2490.15	331	26	39	89	1.55	
17	609.10	2602.50	705	35	45	120	1.35	
18	727.34	3113.60	84	20	36	70	1.89	
19	768.39	3290.98	52	19	36	81	1.19	
20	794.52	3403.94	35	15	29	51	1.23	
21	911.08	3907.63	266	21	27	36	1.96	
22	964.64	4139.06	52	22	44	71	2.04	a
23	968.80	4157.01	100	20	35	61	1.23	b
24	1120.14	4810.85	174	19	28	39	1.56	
25	1237.95	5319.74	79	16	27	39	1.86	
26	1460.88	6282.49	714	30	27	33	2.29	
27	1729.89	7443.92	28	9	16	12	1.10	
28	1764.82	7594.70	141	13	9	4	2.21	

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GDR/PC                    RSSI High Resolution Gamma Spectroscopy                    Ver. 6.02a  
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                          BACKGROUND SUBTRACT RESULTS  
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Sample ID :            082400 PIONEER B-13 2-4 539.5

Bkg File: . . . . H:\GDR\BKG\NOCAL.BKG | Counting Start. . . . . 10-16-08 11:14  
ID: . . . . . 24 Hour Background | Current Date . . . . . 00-00-00 00:00

PK#	ENERGY (keV)	FWHM (keV)	OLD NET COUNTS	OLD UN- CERTAINTY	NEW NET COUNTS	NEW UN- CERTAINTY	FLAG
1	74.85	0.94	294	51	229	51	
4	92.79	1.09	209	46	159	47	
5	185.75	1.14	314	43	285	44	
7	238.59	1.21	1034	56	1004	56	
10	295.09	1.18	596	40	570	40	
13	351.81	1.31	1061	43	1005	43	
15	510.87	3.58	190	28	103	29	
16	583.11	1.55	331	26	308	27	
17	609.10	1.35	705	35	611	35	
21	911.08	1.96	266	21	243	21	
23	968.80	1.23	100	20	88	20	
24	1120.14	1.56	174	19	158	19	
26	1460.88	2.29	714	30	529	30	
28	1764.82	2.21	141	13	121	13	

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GDR/PC RSSI High Resolution Gamma Spectroscopy Ver. 6.02a  
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NUCLIDE ACTIVITY SUMMARY

Sample ID: 082400 PIONEER B-13 2-4 539.5

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Sample Size . . . . . 5.40e+002 g | Spectrum File . . H:\maestros\082400.chn  
Sampling Start. . . . . 00-00-00 00:00 | Counting Start. . . . . 10-16-08 11:14  
Sampling Stop . . . . . 00-00-00 00:00 | Buildup Time. . . . . 0.00e+000 Hrs  
Current Date. . . . . 00-00-00 00:00 | Decay Time [OFF]. . . . . 0.00e+000 Hrs  
-----

Efficiency File.H:\GDR\EFF\500MAR.EFF | Library File. . . . H:\GDR\LIB\1001.LIB  
ID. . . . . . . . . 500 MARINELLI | ID. . . . . . . TH, U, AND K SERIES  
-----

Eff.= 1/[2.90e-002\*En^-2.65e+000 + 9.35e+001\*En^8.20e-001] 02-19-08 12:00  
-----

Gamma Fraction Limit >= . . . 10.00 % | Decay Limit <=. . . 8.000 Halflives  
Library Energy Tolerance. . . 1.20  
-----

FINAL ACTIVITY REPORT

Nuclide	Energy (keV)	Conc +- 1.00sigma (uCi/g)	Halflife )	Peaks (hrs)	Peaks Found
Pb-212	74.82		I.D.Only	1.06e+001	3 of 4
	77.11		I.D.Only		
	238.63	9.44e-007 +-5.26e-008			
Pb-214	Average:	1.49e-006 +-5.33e-008	4.47e-001	4 of 4	
	77.11		I.D.Only		
	241.98	1.51e-006 +-2.53e-007			
	295.21	1.45e-006 +-1.03e-007			
	351.92	1.51e-006 +-6.43e-008			
	92.80		I.D.Only	5.78e+002	1 of 3
Ra-226	186.10		I.D.Only	1.40e+007	1 of 1
Ac-228	Average:	9.63e-007 +-6.95e-008	6.13e+000	3 of 3	
	338.32	9.92e-007 +-1.51e-007			
	911.07	1.06e-006 +-9.16e-008			
	969.11	6.70e-007 +-1.51e-007			
Tl-208	Average:	3.10e-007 +-2.56e-008	5.09e-002	2 of 3	
	510.84	3.58e-007 +-1.00e-007			
	583.14	3.07e-007 +-2.65e-008			
Bi-214	Average:	1.23e-006 +-5.71e-008	3.32e-001	4 of 4	
	609.31	1.15e-006 +-6.54e-008			
	768.36	1.08e-006 +-4.03e-007			
	1120.30	1.49e-006 +-1.80e-007			
	1764.50	1.58e-006 +-1.67e-007			
Bi-212	727.17	1.25e-006 +-2.97e-007	1.01e+000	1 of 4	
K-40	1460.80	8.81e-006 +-4.98e-007	1.12e+013	1 of 1	
TOTAL:		1.50e-005 uCi/g			

## UNKNOWN PEAKS

Energy (keV)	Centroid Channel	Net Counts	Un- Certainty	C.L. Counts	Bkg. Counts	FWHM (keV)	Net Gamma/sec
87.19	345.77	106	39	72	478	1.09	9.208e-001
209.02	872.70	168	41	79	387	1.33	1.295e+000
462.70	1969.61	73	21	38	89	1.44	1.017e+000
794.52	3403.94	35	15	29	51	1.23	7.533e-001
964.64	4139.06	52	22	44	71	2.04	1.319e+000
1237.95	5319.74	79	16	27	39	1.86	2.429e+000
1729.89	7443.92	28	9	16	12	1.10	1.125e+000

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GDR/PC RSSI High Resolution Gamma Spectroscopy Ver. 6.02a  
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Sample ID : 082401 PIONEER B-14 4-6 698

-----  
Sample Size . . . . . 6.98e+002 g | Spectrum File . . H:\maestros\082401.chn  
Sampling Start. . . . . 00-00-00 00:00 | Counting Start. . . . . 10-16-08 12:21  
Sampling Stop . . . . . 00-00-00 00:00 | Live Time . . . . . . . . . 3600 Sec  
Current Date. . . . . 00-00-00 00:00 | Real Time . . . . . . . . . 3604 Sec  
-----

Detector #: 1

Energy(keV)= 7.26 + 0.231\*Ch + 3.28e-008\*Ch^2 + 0.00e+000\*Ch^3 10-16-08 10:31

FWHM(keV) = 0.94 + 0.015\*En + 2.91e-004\*En^2 + 0.00e+000\*En^3 08-13-07 15:28  
Where En = Sqrt(Energy in keV)

Sensitivity . . . . . 0.20 | Search Start / End. . . . . 0 / 8191  
Sigma Multiplier. . . . . 1.00

#### PEAK SEARCH RESULTS

PK. #	ENERGY (keV)	ADDRESS CHANNEL	NET COUNTS	UN- CERTAINTY	C.L. COUNTS	BKG COUNTS	FWHM (keV)	FLAG
1	74.86	292.44	236	50	95	593	0.91	a
2	77.07	301.98	457	53	98	649	1.14	b
3	87.20	345.82	88	47	89	625	0.44	NET < CL
4	92.91	370.49	209	48	89	585	1.27	
5	185.87	772.59	314	45	83	475	1.41	
6	238.58	1000.54	972	50	81	361	1.13	a
7	241.65	1013.81	332	48	91	428	1.44	b
8	270.46	1138.38	117	34	64	266	2.45	
9	277.88	1170.46	101	30	56	207	1.75	
10	295.16	1245.19	579	39	63	243	1.11	
11	338.27	1431.63	217	31	55	189	1.11	
12	351.83	1490.23	1066	42	53	174	1.26	
13	462.94	1970.65	42	22	43	114	1.06	NET < CL
14	511.04	2178.60	180	27	49	125	1.93	
15	583.00	2489.67	338	25	34	66	1.48	
16	609.19	2602.90	726	32	37	79	1.38	
17	727.30	3113.40	79	20	36	73	1.29	
18	768.21	3290.21	58	18	32	59	2.12	
19	911.27	3908.43	246	23	34	60	1.66	
20	933.88	4006.11	22	16	30	58	0.64	NET < CL
21	964.58	4138.79	63	20	40	54	2.11	a
22	968.83	4157.15	135	19	31	43	1.42	b
23	1120.41	4812.03	149	20	32	51	1.94	
24	1377.91	5924.21	27	14	27	33	1.59	NET < CL
25	1460.99	6282.98	756	30	23	24	2.25	
26	1765.16	7596.17	135	13	10	4	1.85	

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GDR/PC                    RSSI High Resolution Gamma Spectroscopy                    Ver. 6.02a  
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                          BACKGROUND SUBTRACT RESULTS  
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Sample ID :            082401 PIONEER B-14 4-6 698

Bkg File: . . . . H:\GDR\BKG\NOCAL.BKG | Counting Start. . . . . 10-16-08 12:21  
ID: . . . . . 24 Hour Background | Current Date . . . . . 00-00-00 00:00

PK#	ENERGY (keV)	FWHM (keV)	OLD NET COUNTS	OLD UN- CERTAINTY	NEW NET COUNTS	NEW UN- CERTAINTY	FLAG
1	74.86	0.91	236	50	172	50	
4	92.91	1.27	209	48	159	48	
5	185.87	1.41	314	45	285	46	
6	238.58	1.13	972	50	943	51	
10	295.16	1.11	579	39	544	40	
12	351.83	1.26	1066	42	1010	42	
14	511.04	1.93	180	27	93	28	
15	583.00	1.48	338	25	315	25	
16	609.19	1.38	726	32	632	33	
19	911.27	1.66	246	23	223	23	
22	968.83	1.42	135	19	123	19	
23	1120.41	1.94	149	20	133	20	
25	1460.99	2.25	756	30	571	30	
26	1765.16	1.85	135	13	115	13	

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GDR/PC RSSI High Resolution Gamma Spectroscopy Ver. 6.02a  
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NUCLIDE ACTIVITY SUMMARY

Sample ID: 082401 PIONEER B-14 4-6 698

-----  
Sample Size . . . . . 6.98e+002 g | Spectrum File . . H:\maestros\082401.chn  
Sampling Start. . . . . 00-00-00 00:00 | Counting Start. . . . . 10-16-08 12:21  
Sampling Stop . . . . . 00-00-00 00:00 | Buildup Time. . . . . 0.00e+000 Hrs  
Current Date. . . . . 00-00-00 00:00 | Decay Time [OFF]. . . . . 0.00e+000 Hrs  
-----

Efficiency File.H:\GDR\EFF\500MAR.EFF | Library File. . . . H:\GDR\LIB\1001.LIB  
ID. . . . . . . . . 500 MARINELLI | ID. . . . . . . TH, U, AND K SERIES  
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Eff.= 1/[2.90e-002\*En^-2.65e+000 + 9.35e+001\*En^8.20e-001] 02-19-08 12:00  
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Gamma Fraction Limit >= . . . 10.00 % | Decay Limit <=. . . 8.000 Halflives  
Library Energy Tolerance. . . 1.20  
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FINAL ACTIVITY REPORT

Nuclide	Energy (keV)	Conc +- 1.00sigma (uCi/g)	Halflife )	Peaks (hrs)	Peaks Found
Pb-212	74.82		I.D.Only	1.06e+001	3 of 4
	77.11		I.D.Only		
	238.63	6.85e-007 +-3.68e-008			
Pb-214	Average:	1.14e-006 +-4.07e-008	4.47e-001	4 of 4	
	77.11		I.D.Only		
	241.98	1.17e-006 +-2.09e-007			
	295.21	1.07e-006 +-7.78e-008			
	351.92	1.17e-006 +-4.90e-008			
Th-234	92.80		I.D.Only	5.78e+002	1 of 3
Ra-226	186.10		I.D.Only	1.40e+007	1 of 1
Tl-208	Average:	2.46e-007 +-1.85e-008	5.09e-002	3 of 3	
	277.35	5.38e-007 +-1.59e-007			
	510.84	2.52e-007 +-7.49e-008			
	583.14	2.42e-007 +-1.92e-008			
Ac-228	Average:	7.56e-007 +-5.54e-008	6.13e+000	3 of 3	
	338.32	8.01e-007 +-1.15e-007			
	911.07	7.49e-007 +-7.67e-008			
	969.11	7.27e-007 +-1.12e-007			
Bi-214	Average:	9.48e-007 +-4.20e-008	3.32e-001	4 of 4	
	609.31	9.16e-007 +-4.73e-008			
	768.36	9.34e-007 +-2.82e-007			
	1120.30	9.73e-007 +-1.45e-007			
	1764.50	1.16e-006 +-1.28e-007			
Bi-212	727.17	9.04e-007 +-2.29e-007	1.01e+000	1 of 4	
K-40	1460.80	7.34e-006 +-3.83e-007	1.12e+013	1 of 1	
TOTAL:		1.20e-005 uCi/g			

## UNKNOWN PEAKS

Energy (keV)	Centroid Channel	Net Counts	Un- Certainty	C.L. Counts	Bkg. Counts	FWHM (keV)	Net Gamma/sec
270.46	1138.38	117	34	64	266	2.45	1.067e+000
964.58	4138.79	63	20	40	54	2.11	1.598e+000

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GDR/PC RSSI High Resolution Gamma Spectroscopy Ver. 6.02a  
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Sample ID : 082402 PIONEER B-15 4-6 697.8

-----  
Sample Size . . . . . 6.98e+002 g | Spectrum File . . H:\maestros\082402.chn  
Sampling Start. . . . . 00-00-00 00:00 | Counting Start. . . . . 10-16-08 13:23  
Sampling Stop . . . . . 00-00-00 00:00 | Live Time . . . . . . . . . 3600 Sec  
Current Date. . . . . 00-00-00 00:00 | Real Time . . . . . . . . . 3604 Sec  
-----

Detector #: 1

Energy(keV)= 7.26 + 0.231\*Ch + 3.28e-008\*Ch^2 + 0.00e+000\*Ch^3 10-16-08 10:31

FWHM(keV) = 0.94 + 0.015\*En + 2.91e-004\*En^2 + 0.00e+000\*En^3 08-13-07 15:28  
Where En = Sqrt(Energy in keV)

Sensitivity . . . . . 0.20 | Search Start / End. . . . . 0 / 8191  
Sigma Multiplier. . . . . 1.00

#### PEAK SEARCH RESULTS

PK. #	ENERGY (keV)	ADDRESS CHANNEL	NET COUNTS	UN- CERTAINTY	C.L. COUNTS	BKG COUNTS	FWHM (keV)	FLAG
1	63.03	241.26	62	35	65	388	0.62	NET < CL
2	74.75	291.96	336	58	112	683	1.13	a
3	76.91	301.28	448	54	101	658	1.11	b
4	86.85	344.28	140	47	89	632	1.17	
5	92.70	369.58	198	48	89	625	1.25	
6	185.85	772.48	250	48	91	568	0.86	
7	208.94	872.35	83	43	83	477	0.89	NET < CL
8	238.53	1000.29	1110	53	85	389	1.14	a
9	241.67	1013.87	382	49	93	440	1.52	b
10	270.25	1137.49	147	38	74	307	2.72	
11	295.12	1245.05	604	42	71	227	1.29	a
12	300.01	1266.18	89	32	63	198	1.23	b
13	338.29	1431.70	224	31	54	193	1.07	
14	351.76	1489.95	1161	45	58	215	1.27	
15	462.79	1970.00	91	22	40	95	1.24	
16	510.96	2178.24	205	26	45	110	1.75	
17	583.00	2489.69	342	28	42	101	1.59	
18	609.14	2602.68	830	36	42	103	1.33	
19	727.09	3112.48	88	19	33	60	1.06	
20	767.57	3287.45	111	18	31	46	2.45	
21	785.35	3364.30	37	17	33	60	2.72	
22	860.64	3689.64	69	17	31	48	1.92	
23	911.08	3907.61	241	22	33	56	1.62	
24	968.92	4157.55	129	22	38	75	1.93	
25	1120.33	4811.67	210	20	27	39	1.62	
26	1238.31	5321.30	57	19	37	65	1.52	
27	1377.80	5923.72	30	13	24	32	1.42	
28	1460.98	6282.96	639	28	26	32	2.02	
29	1729.86	7443.81	26	10	17	13	2.24	
30	1765.14	7596.10	167	15	15	9	3.11	

31 1848.14 7954.36 38 8 10 4 2.87

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GDR/PC                    RSSI High Resolution Gamma Spectroscopy                    Ver. 6.02a  
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=====  
BACKGROUND SUBTRACT RESULTS  
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Sample ID :            082402 PIONEER B-15 4-6 697.8

-----  
Bkg File: . . . . H:\GDR\BKG\NOCAL.BKG | Counting Start. . . . . 10-16-08 13:23  
ID: . . . . . 24 Hour Background | Current Date . . . . . 00-00-00 00:00  
-----

PK#	ENERGY (keV)	FWHM (keV)	OLD NET COUNTS	OLD UN- CERTAINTY	NEW NET COUNTS	NEW UN- CERTAINTY	FLAG
2	74.75	1.13	336	58	272	58	
5	92.70	1.25	198	48	148	48	
6	185.85	0.86	250	48	221	49	
8	238.53	1.14	1110	53	1080	53	
11	295.12	1.29	604	42	576	42	
14	351.76	1.27	1161	45	1105	45	
16	510.96	1.75	205	26	118	27	
17	583.00	1.59	342	28	319	28	
18	609.14	1.33	830	36	736	36	
23	911.08	1.62	241	22	218	22	
24	968.92	1.93	129	22	117	22	
25	1120.33	1.62	210	20	194	20	
28	1460.98	2.02	639	28	454	28	
30	1765.14	3.11	167	15	147	15	

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GDR/PC RSSI High Resolution Gamma Spectroscopy Ver. 6.02a  
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NUCLIDE ACTIVITY SUMMARY

Sample ID: 082402 PIONEER B-15 4-6 697.8

-----  
Sample Size . . . . . 6.98e+002 g | Spectrum File . . H:\maestros\082402.chn  
Sampling Start. . . . . 00-00-00 00:00 | Counting Start. . . . . 10-16-08 13:23  
Sampling Stop . . . . . 00-00-00 00:00 | Buildup Time. . . . . 0.00e+000 Hrs  
Current Date. . . . . 00-00-00 00:00 | Decay Time [OFF]. . . . . 0.00e+000 Hrs  
-----

Efficiency File.H:\GDR\EFF\500MAR.EFF | Library File. . . . H:\GDR\LIB\1001.LIB  
ID. . . . . . . . . 500 MARINELLI | ID. . . . . . . TH, U, AND K SERIES  
-----

Eff.= 1/[2.90e-002\*En^-2.65e+000 + 9.35e+001\*En^8.20e-001] 02-19-08 12:00  
-----

Gamma Fraction Limit >= . . . 10.00 % | Decay Limit <=. . . 8.000 Halflives  
Library Energy Tolerance. . . 1.20  
-----

FINAL ACTIVITY REPORT

Nuclide	Energy (keV)	Conc +- 1.00sigma (uCi/g)	Halflife )	Peaks (hrs)	Peaks Found
Pb-212	Average:	7.87e-007	+3.85e-008	1.06e+001	4 of 4
	74.82		I.D.Only		
	77.11		I.D.Only		
	238.63	7.85e-007	+3.87e-008		
	300.09	9.94e-007	+3.59e-007		
Pb-214	Average:	1.24e-006	+4.31e-008	4.47e-001	4 of 4
	77.11		I.D.Only		
	241.98	1.28e-006	+2.15e-007		
	295.21	1.13e-006	+8.27e-008		
	351.92	1.28e-006	+5.20e-008		
Th-234	92.80		I.D.Only	5.78e+002	1 of 3
Ra-226	186.10		I.D.Only	1.40e+007	1 of 1
Ac-228	Average:	7.49e-007	+5.65e-008	6.13e+000	3 of 3
	338.32	8.28e-007	+1.15e-007		
	911.07	7.34e-007	+7.52e-008		
	969.11	6.93e-007	+1.29e-007		
Tl-208	Average:	2.51e-007	+2.05e-008	5.09e-002	2 of 3
	510.84	3.19e-007	+7.16e-008		
	583.14	2.45e-007	+2.14e-008		
Bi-214	Average:	1.16e-006	+4.58e-008	3.32e-001	4 of 4
	609.31	1.07e-006	+5.18e-008		
	768.36	1.78e-006	+2.93e-007		
	1120.30	1.41e-006	+1.44e-007		
	1764.50	1.48e-006	+1.50e-007		
Bi-212	Average:	1.06e-006	+2.11e-007	1.01e+000	2 of 4
	727.17	1.01e-006	+2.14e-007		
	785.46	2.78e-006	+1.29e-006		
K-40	1460.80	5.84e-006	+3.66e-007	1.12e+013	1 of 1

TOTAL: 1.11e-005 uCi/g

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UNKNOWN PEAKS

Energy (keV)	Centroid Channel	Net Counts	Un- Certainty	C.L. Counts	Bkg. Counts	FWHM (keV)	Net Gamma/sec
86.85	344.28	140	47	89	632	1.17	1.219e+000
270.25	1137.49	147	38	74	307	2.72	1.347e+000
462.79	1970.00	91	22	40	95	1.24	1.262e+000
860.64	3689.64	69	17	31	48	1.92	1.593e+000
1238.31	5321.30	57	19	37	65	1.52	1.759e+000
1377.80	5923.72	30	13	24	32	1.42	9.966e-001
1729.86	7443.81	26	10	17	13	2.24	1.058e+000
1848.14	7954.36	38	8	10	4	2.87	1.619e+000

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GDR/PC RSSI High Resolution Gamma Spectroscopy Ver. 6.02a  
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Sample ID : 082403 PIONEER B-16 4-6 610

-----  
Sample Size . . . . . 6.10e+002 g | Spectrum File . . H:\maestros\082403.chn  
Sampling Start. . . . . 00-00-00 00:00 | Counting Start. . . . . 10-16-08 14:25  
Sampling Stop . . . . . 00-00-00 00:00 | Live Time . . . . . . . . . 3600 Sec  
Current Date. . . . . 00-00-00 00:00 | Real Time . . . . . . . . . 3605 Sec  
-----

Detector #: 1

Energy(keV)= 7.26 + 0.231\*Ch + 3.28e-008\*Ch^2 + 0.00e+000\*Ch^3 10-16-08 10:31

FWHM(keV) = 0.94 + 0.015\*En + 2.91e-004\*En^2 + 0.00e+000\*En^3 08-13-07 15:28  
Where En = Sqrt(Energy in keV)

Sensitivity . . . . . 0.20 | Search Start / End. . . . . 0 / 8191  
Sigma Multiplier. . . . . 1.00

#### PEAK SEARCH RESULTS

PK. #	ENERGY (keV)	ADDRESS CHANNEL	NET COUNTS	UN- CERTAINTY	C.L. COUNTS	BKG COUNTS	FWHM (keV)	FLAG
1	74.66	291.57	396	54	100	724	0.92	a
2	76.89	301.20	571	54	94	709	0.91	b
3	83.86	331.35	165	65	133	868	1.40	a
4	86.97	344.83	238	52	99	675	0.89	b
5	92.75	369.80	363	55	101	750	1.28	
6	185.77	772.13	541	52	93	597	1.39	
7	208.77	871.59	172	49	96	564	1.07	
8	238.47	1000.07	1331	60	96	517	1.08	a
9	241.71	1014.06	498	55	103	565	1.41	b
10	270.47	1138.42	125	43	83	405	1.45	
11	295.03	1244.62	1052	46	66	286	1.17	
12	327.87	1386.67	87	32	61	238	0.99	
13	338.13	1431.01	254	36	66	264	1.37	
14	351.70	1489.69	1737	51	58	215	1.33	
15	462.86	1970.31	62	23	44	125	1.40	
16	510.49	2176.21	230	29	50	140	1.43	
17	583.12	2490.19	397	30	46	124	1.17	
18	609.19	2602.89	1323	42	44	115	1.35	
19	665.71	2847.21	73	20	37	65	1.93	
20	727.31	3113.44	126	21	36	73	1.78	
21	768.09	3289.70	118	25	46	106	1.33	
22	785.45	3364.70	44	20	38	80	1.19	
23	794.95	3405.76	59	17	31	57	1.83	
24	860.44	3688.77	60	18	33	63	3.53	
25	911.16	3907.97	312	24	35	63	1.47	
26	933.88	4006.11	81	16	27	39	1.33	
27	963.96	4136.11	83	35	75	102	3.89	a
28	968.94	4157.62	210	22	36	55	1.54	b
29	1120.29	4811.49	271	24	35	63	2.26	
30	1238.28	5321.17	92	20	35	63	1.63	

31	1377.97	5924.48	69	17	30	43	1.86
32	1408.41	6055.92	32	12	22	25	44.80
33	1461.29	6284.29	671	29	29	37	2.01
34	1730.04	7444.60	61	11	17	13	1.38
35	1765.14	7596.08	244	17	14	9	2.07

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GDR/PC                    RSSI High Resolution Gamma Spectroscopy                    Ver. 6.02a  
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=====  
BACKGROUND SUBTRACT RESULTS  
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Sample ID :                082403 PIONEER B-16 4-6 610

-----  
Bkg File: . . . . H:\GDR\BKG\NOCAL.BKG | Counting Start. . . . . 10-16-08 14:25  
ID: . . . . . 24 Hour Background | Current Date . . . . . 00-00-00 00:00  
-----

PK#	ENERGY (keV)	FWHM (keV)	OLD NET COUNTS	OLD UN- CERTAINTY	NEW NET COUNTS	NEW UN- CERTAINTY	FLAG
1	74.66	0.92	396	54	344	55	
3	83.86	1.40	165	65	153	65	
5	92.75	1.28	363	55	313	55	
6	185.77	1.39	541	52	512	53	
8	238.47	1.08	1331	60	1300	60	
11	295.03	1.17	1052	46	1017	47	
14	351.70	1.33	1737	51	1681	51	
16	510.49	1.43	230	29	143	29	
17	583.12	1.17	397	30	374	30	
18	609.19	1.35	1323	42	1229	43	
25	911.16	1.47	312	24	289	25	
28	968.94	1.54	210	22	198	23	
29	1120.29	2.26	271	24	255	24	
33	1461.29	2.01	671	29	486	30	
35	1765.14	2.07	244	17	224	17	

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GDR/PC RSSI High Resolution Gamma Spectroscopy Ver. 6.02a  
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NUCLIDE ACTIVITY SUMMARY

Sample ID: 082403 PIONEER B-16 4-6 610

-----  
Sample Size . . . . . 6.10e+002 g | Spectrum File . . H:\maestros\082403.chn  
Sampling Start. . . . . 00-00-00 00:00 | Counting Start. . . . . 10-16-08 14:25  
Sampling Stop . . . . . 00-00-00 00:00 | Buildup Time. . . . . 0.00e+000 Hrs  
Current Date. . . . . 00-00-00 00:00 | Decay Time [OFF]. . . . . 0.00e+000 Hrs  
-----  
Efficiency File.H:\GDR\EFF\500MAR.EFF | Library File. . . . H:\GDR\LIB\1001.LIB  
ID. . . . . . . . . 500 MARINELLI | ID. . . . . . . TH, U, AND K SERIES  
-----  
Eff.= 1/[2.90e-002\*En^-2.65e+000 + 9.35e+001\*En^8.20e-001] 02-19-08 12:00  
-----  
Gamma Fraction Limit >= . . . 10.00 % | Decay Limit <=. . . 8.000 Halflives  
Library Energy Tolerance. . . 1.20  
-----  
-----

FINAL ACTIVITY REPORT

Nuclide	Energy (keV)	Conc +- 1.00sigma (uCi/g)	Halflife )	Peaks (hrs)	Peaks Found
Pb-212	74.82	I.D.Only	1.06e+001	3 of	4
	77.11	I.D.Only			
	238.63	1.08e-006 +-4.97e-008			
Pb-214	Average:	2.25e-006 +-5.55e-008	4.47e-001	4 of	4
	77.11	I.D.Only			
	241.98	2.23e-006 +-2.75e-007			
	295.21	2.28e-006 +-1.05e-007			
	351.92	2.23e-006 +-6.75e-008			
Th-228	84.37	I.D.Only	1.68e+004	1 of	2
Th-234	92.80	I.D.Only	5.78e+002	1 of	3
Ra-226	186.10	I.D.Only	1.40e+007	1 of	1
Ac-228	Average:	1.15e-006 +-7.11e-008	6.13e+000	3 of	3
	338.32	1.07e-006 +-1.53e-007			
	911.07	1.11e-006 +-9.45e-008			
	969.11	1.34e-006 +-1.53e-007			
Tl-208	Average:	3.38e-007 +-2.56e-008	5.09e-002	2 of	3
	510.84	4.41e-007 +-9.04e-008			
	583.14	3.29e-007 +-2.67e-008			
Bi-214	Average:	2.10e-006 +-6.25e-008	3.32e-001	4 of	4
	609.31	2.04e-006 +-7.06e-008			
	768.36	2.16e-006 +-4.56e-007			
	1120.30	2.13e-006 +-1.99e-007			
	1764.50	2.59e-006 +-1.98e-007			
Bi-212	Average:	1.71e-006 +-2.73e-007	1.01e+000	2 of	4
	727.17	1.65e-006 +-2.77e-007			
	785.46	3.78e-006 +-1.70e-006			
K-40	1460.80	7.15e-006 +-4.37e-007	1.12e+013	1 of	1

TOTAL: 1.58e-005 uCi/g

---

UNKNOWN PEAKS

Energy (keV)	Centroid Channel	Net Counts	Un- Certainty	C.L. Counts	Bkg. Counts	FWHM (keV)	Net Gamma/sec
86.97	344.83	238	52	99	675	0.89	2.076e+000
208.77	871.59	172	49	96	564	1.07	1.324e+000
270.47	1138.42	125	43	83	405	1.45	1.140e+000
327.87	1386.67	87	32	61	238	0.99	9.190e-001
462.86	1970.31	62	23	44	125	1.40	8.647e-001
665.71	2847.21	73	20	37	65	1.93	1.352e+000
794.95	3405.76	59	17	31	57	1.83	1.270e+000
860.44	3688.77	60	18	33	63	3.53	1.371e+000
933.88	4006.11	81	16	27	39	1.33	1.977e+000
963.96	4136.11	83	35	75	102	3.89	2.081e+000
1238.28	5321.17	92	20	35	63	1.63	2.838e+000
1377.97	5924.48	69	17	30	43	1.86	2.347e+000
1408.41	6055.92	32	12	22	25	44.80	1.083e+000
1730.04	7444.60	61	11	17	13	1.38	2.463e+000

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GDR/PC RSSI High Resolution Gamma Spectroscopy Ver. 6.02a  
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Sample ID : 082404 PIONEER B-17 4-6 649.2

-----  
Sample Size . . . . . 6.49e+002 g | Spectrum File . . H:\maestros\082404.chn  
Sampling Start. . . . . 00-00-00 00:00 | Counting Start. . . . . 10-16-08 15:28  
Sampling Stop . . . . . 00-00-00 00:00 | Live Time . . . . . . . . . 3600 Sec  
Current Date. . . . . 00-00-00 00:00 | Real Time . . . . . . . . . 3605 Sec  
-----

Detector #: 1  
Energy(keV)= 7.26 + 0.231\*Ch + 3.28e-008\*Ch^2 + 0.00e+000\*Ch^3 10-16-08 10:31  
FWHM(keV) = 0.94 + 0.015\*En + 2.91e-004\*En^2 + 0.00e+000\*En^3 08-13-07 15:28  
Where En = Sqrt(Energy in keV)  
-----

Sensitivity . . . . . 0.20 | Search Start / End. . . . . 0 / 8191  
Sigma Multiplier. . . . . 1.00

#### PEAK SEARCH RESULTS

PK. #	ENERGY (keV)	ADDRESS CHANNEL	NET COUNTS	UN- CERTAINTY	C.L. COUNTS	BKG COUNTS	FWHM (keV)	FLAG
1	62.90	240.68	87	48	91	658	0.57	NET < CL
2	74.64	291.48	421	59	110	815	0.91	a
3	76.86	301.07	696	60	106	828	0.96	b
4	87.00	344.93	178	55	104	861	0.62	
5	92.35	368.09	274	59	111	915	1.01	
6	185.85	772.48	562	58	105	768	1.30	
7	238.45	999.98	966	60	105	571	1.12	a
8	241.75	1014.25	668	54	97	547	1.25	b
9	270.23	1137.41	197	49	96	462	2.13	
10	295.06	1244.77	1327	53	77	385	1.05	
11	338.06	1430.70	240	35	65	244	1.57	
12	351.69	1489.65	2522	58	59	230	1.29	
13	462.88	1970.38	98	25	47	135	2.83	
14	510.57	2176.56	173	30	55	177	1.73	
15	583.05	2489.92	388	28	40	95	1.56	
16	609.16	2602.77	1865	48	44	111	1.51	
17	665.23	2845.14	111	20	36	65	2.19	
18	727.38	3113.76	46	24	48	127	0.74	NET < CL
19	768.39	3290.97	141	27	50	131	1.48	
20	785.81	3366.29	58	23	45	109	1.60	
21	911.01	3907.31	236	26	44	102	1.64	
22	934.04	4006.81	96	19	34	63	2.37	
23	964.24	4137.31	55	26	54	77	2.44	a
24	968.93	4157.57	133	23	43	65	2.03	b
25	1120.47	4812.26	402	28	40	77	1.91	
26	1155.04	4961.62	67	19	35	62	2.47	
27	1238.24	5321.01	106	25	47	104	2.00	
28	1377.97	5924.48	130	14	19	15	2.28	
29	1408.46	6056.14	36	14	26	35	1.81	
30	1461.21	6283.93	860	33	31	42	2.07	

31	1510.04	6494.77	60	14	25	28	7.14
32	1730.47	7446.45	67	11	15	8	2.53
33	1765.14	7596.09	321	21	23	22	2.32
34	1848.32	7955.13	50	10	14	8	1.90

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GDR/PC                    RSSI High Resolution Gamma Spectroscopy                    Ver. 6.02a  
=====  
                          BACKGROUND SUBTRACT RESULTS  
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Sample ID :            082404 PIONEER B-17 4-6 649.2

Bkg File: . . . . H:\GDR\BKG\NOCAL.BKG | Counting Start. . . . . 10-16-08 15:28  
ID: . . . . . 24 Hour Background | Current Date . . . . . 00-00-00 00:00

PK#	ENERGY (keV)	FWHM (keV)	OLD NET COUNTS	OLD UN- CERTAINTY	NEW NET COUNTS	NEW UN- CERTAINTY	FLAG
2	74.64	0.91	421	59	371	59	
5	92.35	1.01	274	59	224	59	
6	185.85	1.30	562	58	533	59	
7	238.45	1.12	966	60	935	60	
10	295.06	1.05	1327	53	1292	53	
12	351.69	1.29	2522	58	2466	58	
14	510.57	1.73	173	30	86	31	
15	583.05	1.56	388	28	365	28	
16	609.16	1.51	1865	48	1771	48	
21	911.01	1.64	236	26	213	26	
24	968.93	2.03	133	23	121	23	
25	1120.47	1.91	402	28	386	28	
30	1461.21	2.07	860	33	675	33	
33	1765.14	2.32	321	21	301	21	

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GDR/PC RSSI High Resolution Gamma Spectroscopy Ver. 6.02a  
=====

NUCLIDE ACTIVITY SUMMARY

Sample ID: 082404 PIONEER B-17 4-6 649.2

-----  
Sample Size . . . . . 6.49e+002 g | Spectrum File . . H:\maestros\082404.chn  
Sampling Start. . . . . 00-00-00 00:00 | Counting Start. . . . . 10-16-08 15:28  
Sampling Stop . . . . . 00-00-00 00:00 | Buildup Time. . . . . 0.00e+000 Hrs  
Current Date. . . . . 00-00-00 00:00 | Decay Time [OFF]. . . . . 0.00e+000 Hrs  
-----

Efficiency File.H:\GDR\EFF\500MAR.EFF | Library File. . . . H:\GDR\LIB\1001.LIB  
ID. . . . . . . . . 500 MARINELLI | ID. . . . . . . TH, U, AND K SERIES  
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Eff.= 1/[2.90e-002\*En^-2.65e+000 + 9.35e+001\*En^8.20e-001] 02-19-08 12:00  
-----

Gamma Fraction Limit >= . . . 10.00 % | Decay Limit <=. . . 8.000 Halflives  
Library Energy Tolerance. . . 1.20  
-----

FINAL ACTIVITY REPORT

Nuclide	Energy (keV)	Conc +- 1.00sigma (uCi/g)	Halflife )	Peaks Found
Pb-212	74.82	I.D.Only	1.06e+001	2 of 4
	238.63	7.30e-007 +-4.68e-008		
Pb-214	Average:	2.98e-006 +-5.95e-008	4.47e-001	4 of 4
	77.11	I.D.Only		
	241.98	3.08e-006 +-2.55e-007		
	295.21	2.72e-006 +-1.12e-007		
	351.92	3.08e-006 +-7.30e-008		
Th-234	92.80	I.D.Only	5.78e+002	1 of 3
Ra-226	186.10	I.D.Only	1.40e+007	1 of 1
Ac-228	Average:	8.14e-007 +-6.98e-008	6.13e+000	3 of 3
	338.32	9.52e-007 +-1.41e-007		
	911.07	7.69e-007 +-9.56e-008		
	969.11	7.67e-007 +-1.49e-007		
Tl-208	Average:	2.98e-007 +-2.25e-008	5.09e-002	2 of 3
	510.84	2.48e-007 +-8.85e-008		
	583.14	3.02e-007 +-2.33e-008		
Bi-214	Average:	2.82e-006 +-6.73e-008	3.32e-001	4 of 4
	609.31	2.76e-006 +-7.54e-008		
	768.36	2.45e-006 +-4.66e-007		
	1120.30	3.03e-006 +-2.19e-007		
	1764.50	3.28e-006 +-2.28e-007		
Bi-212	785.46	4.64e-006 +-1.89e-006	1.01e+000	1 of 4
K-40	1460.80	9.34e-006 +-4.56e-007	1.12e+013	1 of 1
TOTAL:		2.16e-005 uCi/g		

UNKNOWN PEAKS

Energy (keV)	Centroid Channel	Net Counts	Un- Certainty	C.L. Counts	Bkg. Counts	FWHM (keV)	Net Gamma/sec
87.00	344.93	178	55	104	861	0.62	1.551e+000
270.23	1137.41	197	49	96	462	2.13	1.801e+000
462.88	1970.38	98	25	47	135	2.83	1.359e+000
665.23	2845.14	111	20	36	65	2.19	2.060e+000
934.04	4006.81	96	19	34	63	2.37	2.350e+000
964.24	4137.31	55	26	54	77	2.44	1.386e+000
1155.04	4961.62	67	19	35	62	2.47	1.972e+000
1238.24	5321.01	106	25	47	104	2.00	3.287e+000
1377.97	5924.48	130	14	19	15	2.28	4.379e+000
1408.46	6056.14	36	14	26	35	1.81	1.238e+000
1510.04	6494.77	60	14	25	28	7.14	2.185e+000
1730.47	7446.45	67	11	15	8	2.53	2.716e+000
1848.32	7955.13	50	10	14	8	1.90	2.135e+000

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GDR/PC RSSI High Resolution Gamma Spectroscopy Ver. 6.02a  
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Sample ID : 082405 PIONEER B-18 2-4 708.6

-----  
Sample Size . . . . . 7.09e+002 g | Spectrum File . . H:\maestros\082405.chn  
Sampling Start. . . . . 00-00-00 00:00 | Counting Start. . . . . 10-16-08 16:30  
Sampling Stop . . . . . 00-00-00 00:00 | Live Time . . . . . . . . . 3600 Sec  
Current Date. . . . . 00-00-00 00:00 | Real Time . . . . . . . . . 3606 Sec  
-----

Detector #: 1

Energy(keV)= 7.26 + 0.231\*Ch + 3.28e-008\*Ch^2 + 0.00e+000\*Ch^3 10-16-08 10:31

FWHM(keV) = 0.94 + 0.015\*En + 2.91e-004\*En^2 + 0.00e+000\*En^3 08-13-07 15:28  
Where En = Sqrt(Energy in keV)

Sensitivity . . . . . 0.20 | Search Start / End. . . . . 0 / 8191  
Sigma Multiplier. . . . . 1.00

#### PEAK SEARCH RESULTS

PK. #	ENERGY (keV)	ADDRESS CHANNEL	NET COUNTS	UN- CERTAINTY	C.L. COUNTS	BKG COUNTS	FWHM (keV)	FLAG
1	74.55	291.10	462	60	113	856	0.85	a
2	76.74	300.57	819	65	115	926	1.00	b
3	86.93	344.62	275	72	145	984	1.12	a
4	89.50	355.75	230	57	109	857	1.07	b
5	92.55	368.94	475	75	148	1047	1.39	c
6	128.60	524.87	23	59	115	980	0.13	NET < CL
7	185.79	772.20	625	59	106	771	1.38	
8	208.98	872.51	164	58	114	757	1.04	
9	238.33	999.42	1523	63	102	563	1.14	a
10	241.52	1013.26	717	58	105	613	1.36	b
11	270.09	1136.78	138	46	89	466	1.39	
12	294.91	1244.13	1324	57	89	417	1.13	a
13	299.82	1265.36	39	42	86	397	1.19	b NET < CL
14	338.05	1430.67	277	37	65	288	1.11	
15	351.62	1489.35	2254	60	75	342	1.27	
16	462.92	1970.57	89	29	55	174	1.16	
17	510.59	2176.67	217	32	58	187	1.91	
18	582.98	2489.61	495	33	49	134	1.16	
19	609.08	2602.42	1760	46	40	92	1.37	
20	727.30	3113.41	63	24	47	123	0.86	
21	768.06	3289.57	154	24	43	98	1.82	
22	786.00	3367.12	53	21	40	87	2.06	
23	860.20	3687.75	63	20	38	79	18.48	
24	911.04	3907.43	354	27	41	85	1.79	
25	933.94	4006.40	108	20	35	63	1.56	
26	968.87	4157.30	152	24	43	98	1.48	
27	1120.39	4811.95	388	28	42	84	1.31	
28	1238.16	5320.67	132	23	40	79	1.87	
29	1281.15	5506.35	49	14	24	29	2.90	
30	1377.99	5924.55	100	17	29	39	1.75	

31	1408.35	6055.68	51	14	25	28	1.41
32	1461.26	6284.13	825	35	41	76	2.09
33	1509.43	6492.17	31	14	26	33	1.99
34	1730.56	7446.85	59	12	19	17	1.76
35	1765.31	7596.84	325	18	0	0	2.83

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GDR/PC                    RSSI High Resolution Gamma Spectroscopy                    Ver. 6.02a  
=====  
                          BACKGROUND SUBTRACT RESULTS  
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Sample ID :            082405 PIONEER B-18 2-4 708.6

Bkg File: . . . . H:\GDR\BKG\NOCAL.BKG | Counting Start. . . . . 10-16-08 16:30  
ID: . . . . . 24 Hour Background | Current Date . . . . . 00-00-00 00:00

PK#	ENERGY (keV)	FWHM (keV)	OLD NET COUNTS	OLD UN- CERTAINTY	NEW NET COUNTS	NEW UN- CERTAINTY	FLAG
1	74.55	0.85	462	60	420	61	
5	92.55	1.39	475	75	425	75	
7	185.79	1.38	625	59	596	59	
9	238.33	1.14	1523	63	1495	64	
12	294.91	1.13	1324	57	1303	57	
15	351.62	1.27	2254	60	2198	60	
17	510.59	1.91	217	32	130	32	
18	582.98	1.16	495	33	472	33	
19	609.08	1.37	1760	46	1666	46	
24	911.04	1.79	354	27	331	27	
26	968.87	1.48	152	24	140	24	
27	1120.39	1.31	388	28	372	28	
32	1461.26	2.09	825	35	640	35	
35	1765.31	2.83	325	18	305	18	

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GDR/PC RSSI High Resolution Gamma Spectroscopy Ver. 6.02a  
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NUCLIDE ACTIVITY SUMMARY

Sample ID: 082405 PIONEER B-18 2-4 708.6

-----  
Sample Size . . . . . 7.09e+002 g | Spectrum File . . H:\maestros\082405.chn  
Sampling Start. . . . . 00-00-00 00:00 | Counting Start. . . . . 10-16-08 16:30  
Sampling Stop . . . . . 00-00-00 00:00 | Buildup Time. . . . . 0.00e+000 Hrs  
Current Date. . . . . 00-00-00 00:00 | Decay Time [OFF]. . . . . 0.00e+000 Hrs  
-----  
Efficiency File.H:\GDR\EFF\500MAR.EFF | Library File. . . . H:\GDR\LIB\1001.LIB  
ID. . . . . . . . . 500 MARINELLI | ID. . . . . . . TH, U, AND K SERIES  
-----  
Eff.= 1/[2.90e-002\*En^-2.65e+000 + 9.35e+001\*En^8.20e-001] 02-19-08 12:00  
-----  
Gamma Fraction Limit >= . . . 10.00 % | Decay Limit <=. . . 8.000 Halflives  
Library Energy Tolerance. . . 1.20  
-----

FINAL ACTIVITY REPORT

Nuclide	Energy (keV)	Conc +- 1.00sigma (uCi/g)	Halflife )	Peaks (hrs)	Peaks Found
Pb-212	74.82	I.D.Only	1.06e+001	3	of 4
	77.11	I.D.Only			
	238.63	1.07e-006 +-4.55e-008			
Pb-214	Average:	2.51e-006 +-5.68e-008	4.47e-001	4	of 4
	77.11	I.D.Only			
	241.98	2.51e-006 +-2.50e-007			
	295.21	2.52e-006 +-1.09e-007			
	351.92	2.51e-006 +-6.90e-008			
Th-234	92.80	I.D.Only	5.78e+002	1	of 3
Ra-226	186.10	I.D.Only	1.40e+007	1	of 1
Ra-224	240.98	1.09e-006 +-4.74e-007	8.69e+001	1	of 1
Ac-228	Average:	1.01e-006 +-6.64e-008	6.13e+000	3	of 3
	338.32	1.01e-006 +-1.33e-007			
	911.07	1.10e-006 +-9.10e-008			
	969.11	8.13e-007 +-1.42e-007			
Tl-208	Average:	3.56e-007 +-2.39e-008	5.09e-002	2	of 3
	510.84	3.46e-007 +-8.60e-008			
	583.14	3.57e-007 +-2.49e-008			
Bi-214	Average:	2.47e-006 +-5.88e-008	3.32e-001	4	of 4
	609.31	2.38e-006 +-6.63e-008			
	768.36	2.44e-006 +-3.86e-007			
	1120.30	2.67e-006 +-2.03e-007			
	1764.50	3.04e-006 +-1.80e-007			
Bi-212	Average:	8.11e-007 +-2.72e-007	1.01e+000	2	of 4
	727.17	7.09e-007 +-2.76e-007			
	785.46	3.95e-006 +-1.53e-006			
K-40	1460.80	8.11e-006 +-4.42e-007	1.12e+013	1	of 1

TOTAL: 1.74e-005 uCi/g

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UNKNOWN PEAKS

Energy (keV)	Centroid Channel	Net Counts	Un- Certainty	C.L. Counts	Bkg. Counts	FWHM (keV)	Net Gamma/sec
86.93	344.62	275	72	145	984	1.12	2.395e+000
89.50	355.75	230	57	109	857	1.07	1.939e+000
208.98	872.51	164	58	114	757	1.04	1.265e+000
270.09	1136.78	138	46	89	466	1.39	1.256e+000
462.92	1970.57	89	29	55	174	1.16	1.232e+000
860.20	3687.75	63	20	38	79	18.48	1.440e+000
933.94	4006.40	108	20	35	63	1.56	2.653e+000
1238.16	5320.67	132	23	40	79	1.87	4.093e+000
1281.15	5506.35	49	14	24	29	2.90	1.549e+000
1377.99	5924.55	100	17	29	39	1.75	3.373e+000
1408.35	6055.68	51	14	25	28	1.41	1.754e+000
1509.43	6492.17	31	14	26	33	1.99	1.117e+000
1730.56	7446.85	59	12	19	17	1.76	2.416e+000

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GDR/PC RSSI High Resolution Gamma Spectroscopy Ver. 6.02a  
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Sample ID : 082406 PIONEER B-19 4-6 684.6

-----  
Sample Size . . . . . 6.85e+002 g | Spectrum File . . H:\maestros\082406.chn  
Sampling Start. . . . . 00-00-00 00:00 | Counting Start. . . . . 10-16-08 17:33  
Sampling Stop . . . . . 00-00-00 00:00 | Live Time . . . . . . . . . 3600 Sec  
Current Date. . . . . 00-00-00 00:00 | Real Time . . . . . . . . . 3604 Sec  
-----

Detector #: 1

Energy(keV)= 7.26 + 0.231\*Ch + 3.28e-008\*Ch^2 + 0.00e+000\*Ch^3 10-16-08 10:31

FWHM(keV) = 0.94 + 0.015\*En + 2.91e-004\*En^2 + 0.00e+000\*En^3 08-13-07 15:28  
Where En = Sqrt(Energy in keV)

Sensitivity . . . . . 0.20 | Search Start / End. . . . . 0 / 8191  
Sigma Multiplier. . . . . 1.00

#### PEAK SEARCH RESULTS

PK. #	ENERGY (keV)	ADDRESS CHANNEL	NET COUNTS	UN- CERTAINTY	C.L. COUNTS	BKG COUNTS	FWHM (keV)	FLAG
1	74.84	292.36	327	58	113	716	1.09	a
2	77.00	301.68	433	54	99	666	1.15	b
3	87.08	345.29	92	46	89	621	1.38	
4	92.78	369.95	281	50	94	611	1.71	
5	185.99	773.10	359	47	86	509	1.32	
6	209.48	874.67	108	42	80	443	2.83	
7	238.65	1000.82	1095	53	86	394	1.10	a
8	241.73	1014.17	357	49	92	436	1.41	b
9	270.14	1137.00	31	34	67	309	1.48	NET < CL
10	295.20	1245.37	624	40	63	240	1.31	
11	338.15	1431.11	222	33	59	230	1.18	
12	351.84	1490.31	1140	42	50	153	1.33	
13	463.03	1971.06	52	26	51	143	1.43	
14	511.14	2179.06	156	27	49	147	1.31	
15	583.17	2490.44	313	29	48	133	1.54	
16	609.42	2603.89	823	33	35	70	1.67	
17	727.81	3115.61	89	19	34	58	1.36	
18	768.60	3291.90	66	21	39	83	1.45	
19	795.07	3406.28	55	17	32	53	2.19	
20	861.27	3692.40	56	18	33	56	0.98	
21	911.45	3909.22	232	23	36	73	1.28	
22	964.93	4140.31	33	20	40	70	1.44	a NET < CL
23	969.37	4159.48	134	21	36	64	1.52	b
24	1120.66	4813.11	157	21	34	58	1.75	
25	1238.47	5321.97	57	20	37	70	2.60	
26	1378.31	5925.97	55	13	22	25	0.92	
27	1408.92	6058.12	19	13	25	28	0.61	NET < CL
28	1461.57	6285.49	958	32	19	16	2.07	
29	1765.80	7598.94	168	13	0	0	2.03	

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GDR/PC RSSI High Resolution Gamma Spectroscopy Ver. 6.02a  
=====  
BACKGROUND SUBTRACT RESULTS  
=====

Sample ID : 082406 PIONEER B-19 4-6 684.6

Bkg File: . . . H:\GDR\BKG\NOCAL.BKG | Counting Start. . . . 10-16-08 17:33  
ID: . . . . . 24 Hour Background | Current Date . . . . 00-00-00 00:00  
-----

PK#	ENERGY (keV)	FWHM (keV)	OLD NET COUNTS	OLD UN- CERTAINTY	NEW NET COUNTS	NEW UN- CERTAINTY	FLAG
1	74.84	1.09	327	58	258	59	
4	92.78	1.71	281	50	231	51	
5	185.99	1.32	359	47	330	48	
7	238.65	1.10	1095	53	1068	53	
10	295.20	1.31	624	40	589	40	
12	351.84	1.33	1140	42	1084	42	
14	511.14	1.31	156	27	69	28	
15	583.17	1.54	313	29	290	30	
16	609.42	1.67	823	33	729	34	
21	911.45	1.28	232	23	209	24	
23	969.37	1.52	134	21	122	21	
24	1120.66	1.75	157	21	141	21	
28	1461.57	2.07	958	32	773	32	

=====  
GDR/PC RSSI High Resolution Gamma Spectroscopy Ver. 6.02a  
=====

NUCLIDE ACTIVITY SUMMARY

Sample ID: 082406 PIONEER B-19 4-6 684.6

-----  
Sample Size . . . . . 6.85e+002 g | Spectrum File . . H:\maestros\082406.chn  
Sampling Start. . . . . 00-00-00 00:00 | Counting Start. . . . . 10-16-08 17:33  
Sampling Stop . . . . . 00-00-00 00:00 | Buildup Time. . . . . 0.00e+000 Hrs  
Current Date. . . . . 00-00-00 00:00 | Decay Time [OFF]. . . . . 0.00e+000 Hrs  
-----

Efficiency File.H:\GDR\EFF\500MAR.EFF | Library File. . . . H:\GDR\LIB\1001.LIB  
ID. . . . . . . . . 500 MARINELLI | ID. . . . . . . TH, U, AND K SERIES  
-----

Eff.= 1/[2.90e-002\*En^-2.65e+000 + 9.35e+001\*En^8.20e-001] 02-19-08 12:00  
-----

Gamma Fraction Limit >= . . . 10.00 % | Decay Limit <=. . . 8.000 Halflives  
Library Energy Tolerance. . . 1.20  
-----

FINAL ACTIVITY REPORT

Nuclide	Energy (keV)	Conc +- 1.00sigma (uCi/g)	Halflife )	Peaks Found
Pb-212	74.82	I.D.Only	1.06e+001	3 of 4
	77.11	I.D.Only		
	238.63	7.91e-007 +-3.96e-008		
Pb-214	Average:	1.26e-006 +-4.15e-008	4.47e-001	4 of 4
	77.11	I.D.Only		
	241.98	1.28e-006 +-2.17e-007		
	295.21	1.18e-006 +-8.01e-008		
	351.92	1.28e-006 +-4.98e-008		
	92.80	I.D.Only	5.78e+002	1 of 3
Ra-226	186.10	I.D.Only	1.40e+007	1 of 1
Ac-228	Average:	7.49e-007 +-5.98e-008	6.13e+000	3 of 3
	338.32	8.33e-007 +-1.25e-007		
	911.07	7.19e-007 +-8.09e-008		
	969.11	7.34e-007 +-1.26e-007		
Tl-208	Average:	2.24e-007 +-2.22e-008	5.09e-002	2 of 3
	510.84	1.91e-007 +-7.66e-008		
	583.14	2.27e-007 +-2.32e-008		
Bi-214	Average:	1.08e-006 +-4.68e-008	3.32e-001	3 of 4
	609.31	1.08e-006 +-4.96e-008		
	768.36	1.08e-006 +-3.39e-007		
	1120.30	1.05e-006 +-1.55e-007		
Bi-212	727.17	1.05e-006 +-2.21e-007	1.01e+000	1 of 4
K-40	1460.80	1.01e-005 +-4.25e-007	1.12e+013	1 of 1
TOTAL:		1.53e-005 uCi/g		

UNKNOWN PEAKS

Energy (keV)	Centroid Channel	Net Counts	Un- Certainty	C.L. Counts	Bkg. Counts	FWHM (keV)	Net Gamma/sec
87.08	345.29	92	46	89	621	1.38	8.034e-001
209.48	874.67	108	42	80	443	2.83	8.359e-001
463.03	1971.06	52	26	51	143	1.43	7.169e-001
795.07	3406.28	55	17	32	53	2.19	1.174e+000
861.27	3692.40	56	18	33	56	0.98	1.287e+000
1238.47	5321.97	57	20	37	70	2.60	1.775e+000
1378.31	5925.97	55	13	22	25	0.92	1.842e+000
1765.80	7598.94	168	13	0	0	2.03	6.956e+000

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GDR/PC RSSI High Resolution Gamma Spectroscopy Ver. 6.02a  
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Sample ID : 082407 PIONEER B-20 2-4 707

-----  
Sample Size . . . . . 7.07e+002 g | Spectrum File . . H:\maestros\082407.chn  
Sampling Start. . . . . 00-00-00 00:00 | Counting Start. . . . . 10-17-08 11:04  
Sampling Stop . . . . . 00-00-00 00:00 | Live Time . . . . . . . . . 3600 Sec  
Current Date. . . . . 00-00-00 00:00 | Real Time . . . . . . . . . 3604 Sec  
-----

Detector #: 1

Energy(keV)= 6.93 + 0.231\*Ch + 3.26e-008\*Ch^2 + 0.00e+000\*Ch^3 10-17-08 10:43

FWHM(keV) = 0.94 + 0.015\*En + 2.91e-004\*En^2 + 0.00e+000\*En^3 08-13-07 15:28  
Where En = Sqrt(Energy in keV)

Sensitivity . . . . . 0.20 | Search Start / End. . . . . 0 / 8191  
Sigma Multiplier. . . . . 1.00

#### PEAK SEARCH RESULTS

PK. #	ENERGY (keV)	ADDRESS CHANNEL	NET COUNTS	UN- CERTAINTY	C.L. COUNTS	BKG COUNTS	FWHM (keV)	FLAG
1	63.17	243.25	67	45	88	570	0.86	NET < CL
2	74.53	292.40	359	55	104	698	0.93	a
3	76.75	302.00	522	53	95	680	0.98	b
4	86.90	345.90	128	48	90	693	0.97	
5	92.73	371.13	337	56	107	742	1.56	
6	185.65	772.98	343	49	90	565	1.50	
7	208.89	873.49	104	42	81	451	1.91	
8	238.30	1000.66	1236	54	83	413	1.00	a
9	241.41	1014.11	383	50	94	495	1.35	b
10	269.79	1136.83	206	41	78	322	1.98	
11	294.90	1245.40	651	43	69	309	1.09	
12	327.48	1386.28	49	32	63	240	0.64	NET < CL
13	337.89	1431.28	271	34	61	228	1.49	
14	351.56	1490.39	1352	47	60	220	1.35	
15	462.49	1969.98	55	25	48	147	0.77	
16	510.35	2176.85	194	31	56	165	1.99	
17	582.73	2489.72	385	28	41	97	1.31	
18	608.89	2602.81	950	37	40	95	1.73	
19	726.76	3112.23	67	20	36	81	1.71	
20	768.10	3290.86	89	21	38	77	1.71	
21	794.12	3403.35	45	19	36	76	1.22	
22	835.60	3582.57	45	14	25	40	1.75	
23	860.12	3688.53	32	19	36	78	0.51	NET < CL
24	910.74	3907.23	277	22	29	45	1.89	
25	964.07	4137.63	68	28	57	97	2.15	a
26	968.50	4156.79	150	22	37	67	1.42	b
27	1119.94	4810.99	196	20	28	38	1.68	
28	1238.14	5321.54	61	17	32	51	1.97	
29	1377.44	5923.14	56	14	25	30	1.13	
30	1407.35	6052.30	23	14	26	32	0.75	NET < CL

31	1460.60	6282.20	832	31	21	20	1.77
32	1729.60	7443.51	42	9	14	8	1.36
33	1764.44	7593.91	191	14	0	0	1.89
34	1847.73	7953.36	29	7	10	4	2.21

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GDR/PC                    RSSI High Resolution Gamma Spectroscopy                    Ver. 6.02a  
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                          BACKGROUND SUBTRACT RESULTS  
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Sample ID :            082407 PIONEER B-20 2-4 707

Bkg File: . . . . H:\GDR\BKG\NOCAL.BKG | Counting Start. . . . . 10-17-08 11:04  
ID: . . . . . 24 Hour Background | Current Date . . . . . 00-00-00 00:00

PK#	ENERGY (keV)	FWHM (keV)	OLD NET COUNTS	OLD UN- CERTAINTY	NEW NET COUNTS	NEW UN- CERTAINTY	FLAG
2	74.53	0.93	359	55	316	55	
5	92.73	1.56	337	56	287	57	
6	185.65	1.50	343	49	314	50	
8	238.30	1.00	1236	54	1210	54	
11	294.90	1.09	651	43	616	43	
14	351.56	1.35	1352	47	1296	47	
16	510.35	1.99	194	31	107	31	
17	582.73	1.31	385	28	362	28	
18	608.89	1.73	950	37	856	37	
24	910.74	1.89	277	22	254	22	
26	968.50	1.42	150	22	138	22	
27	1119.94	1.68	196	20	180	20	
31	1460.60	1.77	832	31	647	31	
33	1764.44	1.89	191	14	171	14	

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GDR/PC RSSI High Resolution Gamma Spectroscopy Ver. 6.02a  
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NUCLIDE ACTIVITY SUMMARY

Sample ID: 082407 PIONEER B-20 2-4 707

-----  
Sample Size . . . . . 7.07e+002 g | Spectrum File . . H:\maestros\082407.chn  
Sampling Start. . . . . 00-00-00 00:00 | Counting Start. . . . . 10-17-08 11:04  
Sampling Stop . . . . . 00-00-00 00:00 | Buildup Time. . . . . 0.00e+000 Hrs  
Current Date. . . . . 00-00-00 00:00 | Decay Time [OFF]. . . . . 0.00e+000 Hrs  
-----  
Efficiency File.H:\GDR\EFF\500MAR.EFF | Library File. . . . H:\GDR\LIB\1001.LIB  
ID. . . . . . . . . 500 MARINELLI | ID. . . . . . . TH, U, AND K SERIES  
-----  
Eff.= 1/[2.90e-002\*En^-2.65e+000 + 9.35e+001\*En^8.20e-001] 02-19-08 12:00  
-----  
Gamma Fraction Limit >= . . . 10.00 % | Decay Limit <=. . . 8.000 Halflives  
Library Energy Tolerance. . . 1.20  
-----

FINAL ACTIVITY REPORT

Nuclide	Energy (keV)	Conc +- 1.00sigma (uCi/g)	Halflife )	Peaks (hrs)	Peaks Found
Pb-212	74.82		I.D.Only	1.06e+001	3 of 4
	77.11		I.D.Only		
	238.63	8.67e-007 +-3.88e-008			
Pb-214	Average:	1.40e-006 +-4.46e-008	4.47e-001	4 of 4	
	77.11		I.D.Only		
	241.98	1.49e-006 +-2.16e-007			
	295.21	1.19e-006 +-8.34e-008			
	351.92	1.48e-006 +-5.44e-008			
Th-234	92.80		I.D.Only	5.78e+002	1 of 3
Ra-226	186.10		I.D.Only	1.40e+007	1 of 1
Ac-228	Average:	8.64e-007 +-5.66e-008	6.13e+000	3 of 3	
	338.32	9.86e-007 +-1.25e-007			
	911.07	8.43e-007 +-7.33e-008			
	969.11	8.02e-007 +-1.26e-007			
Tl-208	Average:	2.75e-007 +-2.08e-008	5.09e-002	2 of 3	
	510.84	2.83e-007 +-8.22e-008			
	583.14	2.75e-007 +-2.15e-008			
Bi-214	Average:	1.29e-006 +-4.61e-008	3.32e-001	4 of 4	
	609.31	1.22e-006 +-5.27e-008			
	768.36	1.41e-006 +-3.31e-007			
	1120.30	1.29e-006 +-1.41e-007			
	1764.50	1.71e-006 +-1.39e-007			
Bi-212	727.17	7.59e-007 +-2.24e-007	1.01e+000	1 of 4	
K-40	1460.80	8.21e-006 +-3.90e-007	1.12e+013	1 of 1	
TOTAL:		1.37e-005 uCi/g			

## UNKNOWN PEAKS

Energy (keV)	Centroid Channel	Net Counts	Un- Certainty	C.L. Counts	Bkg. Counts	FWHM (keV)	Net Gamma/sec
86.90	345.90	128	48	90	693	0.97	1.114e+000
208.89	873.49	104	42	81	451	1.91	8.037e-001
269.79	1136.82	206	41	78	322	1.98	1.881e+000
462.49	1969.98	55	25	48	147	0.77	7.578e-001
794.12	3403.35	45	19	36	76	1.22	9.681e-001
835.60	3582.57	45	14	25	40	1.75	1.017e+000
964.07	4137.63	68	28	57	97	2.15	1.724e+000
1238.14	5321.54	61	17	32	51	1.97	1.878e+000
1377.44	5923.14	56	14	25	30	1.13	1.885e+000
1729.60	7443.51	42	9	14	8	1.36	1.696e+000
1847.73	7953.36	29	7	10	4	2.21	1.255e+000

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GDR/PC RSSI High Resolution Gamma Spectroscopy Ver. 6.02a  
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Sample ID : 082408 PIONEER B-21 2-4 624.5

-----  
Sample Size . . . . . 6.25e+002 g | Spectrum File . . H:\maestros\082408.chn  
Sampling Start. . . . . 00-00-00 00:00 | Counting Start. . . . . 10-17-08 12:06  
Sampling Stop . . . . . 00-00-00 00:00 | Live Time . . . . . . . . . 3600 Sec  
Current Date. . . . . 00-00-00 00:00 | Real Time . . . . . . . . . 3603 Sec  
-----

Detector #: 1  
Energy(keV)= 6.93 + 0.231\*Ch + 3.26e-008\*Ch^2 + 0.00e+000\*Ch^3 10-17-08 10:43  
FWHM(keV) = 0.94 + 0.015\*En + 2.91e-004\*En^2 + 0.00e+000\*En^3 08-13-07 15:28  
Where En = Sqrt(Energy in keV)  
-----

Sensitivity . . . . . 0.20 | Search Start / End. . . . . 0 / 8191  
Sigma Multiplier. . . . . 1.00

#### PEAK SEARCH RESULTS

PK. #	ENERGY (keV)	ADDRESS CHANNEL	NET COUNTS	UN- CERTAINTY	C.L. COUNTS	BKG COUNTS	FWHM (keV)	FLAG
1	74.46	292.11	144	42	79	453	0.79	a
2	76.67	301.65	286	43	77	467	0.94	b
3	86.57	344.48	53	40	75	481	0.89	NET < CL
4	92.19	368.80	149	43	80	475	0.82	
5	185.34	771.64	131	42	81	456	1.61	
6	238.20	1000.21	747	46	75	318	1.02	a
7	241.30	1013.63	217	43	82	365	1.34	b
8	277.07	1168.29	33	26	49	180	0.61	NET < CL
9	294.75	1244.74	305	34	58	218	1.20	
10	337.86	1431.15	133	28	52	175	0.83	
11	351.42	1489.79	634	33	43	119	1.27	
12	462.40	1969.57	41	18	34	76	1.71	
13	510.49	2177.47	169	25	44	105	1.66	
14	582.68	2489.53	237	23	35	70	1.65	
15	608.77	2602.30	470	27	34	63	1.57	
16	726.82	3112.51	56	19	36	70	2.15	
17	767.96	3290.30	60	18	33	56	1.15	
18	860.59	3690.53	47	18	34	59	3.16	
19	910.77	3907.35	127	22	39	81	1.52	
20	968.54	4156.95	116	17	27	39	2.47	
21	1119.91	4810.87	84	19	35	56	2.11	
22	1460.59	6282.17	949	33	23	23	2.06	
23	1764.57	7594.45	65	9	10	4	5.00	

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GDR/PC                    RSSI High Resolution Gamma Spectroscopy                    Ver. 6.02a  
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BACKGROUND SUBTRACT RESULTS  
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Sample ID :                082408 PIONEER B-21 2-4 624.5

-----  
Bkg File: . . . H:\GDR\BKG\NOCAL.BKG | Counting Start. . . . . 10-17-08 12:06  
ID: . . . . . 24 Hour Background | Current Date . . . . . 00-00-00 00:00  
-----

PK#	ENERGY (keV)	FWHM (keV)	OLD NET COUNTS	OLD UN- CERTAINTY	NEW NET COUNTS	NEW UN- CERTAINTY	FLAG
1	74.46	0.79	144	42	110	42	
4	92.19	0.82	149	43	99	43	
5	185.34	1.61	131	42	110	43	
6	238.20	1.02	747	46	724	46	
9	294.75	1.20	305	34	270	34	
11	351.42	1.27	634	33	578	33	
13	510.49	1.66	169	25	82	26	
14	582.68	1.65	237	23	214	23	
15	608.77	1.57	470	27	376	27	
19	910.77	1.52	127	22	104	22	
20	968.54	2.47	116	17	104	17	
21	1119.91	2.11	84	19	68	19	
22	1460.59	2.06	949	33	764	33	
23	1764.57	5.00	65	9	45	9	

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GDR/PC RSSI High Resolution Gamma Spectroscopy Ver. 6.02a  
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NUCLIDE ACTIVITY SUMMARY

Sample ID: 082408 PIONEER B-21 2-4 624.5

-----  
Sample Size . . . . . 6.25e+002 g | Spectrum File . . H:\maestros\082408.chn  
Sampling Start. . . . . 00-00-00 00:00 | Counting Start. . . . . 10-17-08 12:06  
Sampling Stop . . . . . 00-00-00 00:00 | Buildup Time. . . . . 0.00e+000 Hrs  
Current Date. . . . . 00-00-00 00:00 | Decay Time [OFF]. . . . . 0.00e+000 Hrs  
-----

Efficiency File.H:\GDR\EFF\500MAR.EFF | Library File. . . . H:\GDR\LIB\1001.LIB  
ID. . . . . . . . . 500 MARINELLI | ID. . . . . . . TH, U, AND K SERIES  
-----

Eff.= 1/[2.90e-002\*En^-2.65e+000 + 9.35e+001\*En^8.20e-001] 02-19-08 12:00  
-----

Gamma Fraction Limit >= . . . 10.00 % | Decay Limit <=. . . 8.000 Halflives  
Library Energy Tolerance. . . 1.20  
-----

FINAL ACTIVITY REPORT

Nuclide	Energy (keV)	Conc +- 1.00sigma (uCi/g)	Halflife )	Peaks (hrs)	Peaks Found
Pb-212	74.82		I.D.Only	1.06e+001	3 of 4
	77.11		I.D.Only		
	238.63	5.87e-007 +-3.73e-008			
Pb-214	Average:	7.11e-007 +-3.68e-008	4.47e-001	4 of 4	
	77.11		I.D.Only		
	241.98	7.51e-007 +-2.08e-007			
	295.21	5.91e-007 +-7.47e-008			
	351.92	7.49e-007 +-4.32e-008			
Th-234	92.80		I.D.Only	5.78e+002	1 of 3
Ra-226	186.10		I.D.Only	1.40e+007	1 of 1
Ac-228	Average:	5.09e-007 +-5.83e-008	6.13e+000	3 of 3	
	338.32	5.50e-007 +-1.17e-007			
	911.07	3.93e-007 +-8.37e-008			
	969.11	6.82e-007 +-1.13e-007			
Tl-208	Average:	1.88e-007 +-1.93e-008	5.09e-002	2 of 3	
	510.84	2.48e-007 +-7.69e-008			
	583.14	1.84e-007 +-1.99e-008			
Bi-214	Average:	5.99e-007 +-3.94e-008	3.32e-001	4 of 4	
	609.31	6.08e-007 +-4.45e-008			
	768.36	1.08e-006 +-3.17e-007			
	1120.30	5.54e-007 +-1.56e-007			
	1764.50	5.11e-007 +-1.07e-007			
Bi-212	727.17	7.15e-007 +-2.47e-007	1.01e+000	1 of 4	
K-40	1460.80	1.10e-005 +-4.72e-007	1.12e+013	1 of 1	
TOTAL:		1.43e-005 uCi/g			

## UNKNOWN PEAKS

Energy (keV)	Centroid Channel	Net Counts	Un- Certainty	C.L. Counts	Bkg. Counts	FWHM (keV)	Net Gamma/sec
462.40	1969.57	41	18	34	76	1.71	5.692e-001
860.59	3690.53	47	18	34	59	3.16	1.088e+000

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GDR/PC RSSI High Resolution Gamma Spectroscopy Ver. 6.02a  
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Sample ID : 082409 PIONEER B-22 4-6 670.2

-----  
Sample Size . . . . . 6.70e+002 g | Spectrum File . . H:\maestros\082409.chn  
Sampling Start. . . . . 00-00-00 00:00 | Counting Start. . . . . 10-17-08 13:07  
Sampling Stop . . . . . 00-00-00 00:00 | Live Time . . . . . . . . . 3600 Sec  
Current Date. . . . . 00-00-00 00:00 | Real Time . . . . . . . . . 3605 Sec  
-----

Detector #: 1  
Energy(keV)= 6.93 + 0.231\*Ch + 3.26e-008\*Ch^2 + 0.00e+000\*Ch^3 10-17-08 10:43  
FWHM(keV) = 0.94 + 0.015\*En + 2.91e-004\*En^2 + 0.00e+000\*En^3 08-13-07 15:28  
Where En = Sqrt(Energy in keV)  
-----

Sensitivity . . . . . 0.20 | Search Start / End. . . . . 0 / 8191  
Sigma Multiplier. . . . . 1.00

#### PEAK SEARCH RESULTS

PK. #	ENERGY (keV)	ADDRESS CHANNEL	NET COUNTS	UN- CERTAINTY	C.L. COUNTS	BKG COUNTS	FWHM (keV)	FLAG
1	74.33	291.52	402	62	119	884	1.06	a
2	76.59	301.31	641	55	95	736	0.91	b
3	83.67	331.94	104	59	120	744	1.02	a NET < CL
4	86.73	345.17	236	46	82	606	0.82	b
5	89.23	355.98	166	51	97	716	0.95	c
6	92.29	369.23	238	58	114	728	0.95	d
7	185.61	772.80	478	56	103	691	1.26	
8	208.44	871.54	177	51	99	603	1.26	
9	238.15	999.99	1513	59	91	455	1.15	a
10	241.23	1013.30	517	57	107	571	1.43	b
11	270.31	1139.06	110	41	80	417	1.13	
12	276.93	1167.71	50	32	61	294	0.73	NET < CL
13	294.66	1244.37	906	49	79	325	1.05	a
14	299.30	1264.40	79	29	53	230	0.82	b
15	327.57	1386.64	122	34	66	253	1.34	
16	337.75	1430.68	271	36	64	266	1.12	
17	351.36	1489.52	1662	51	62	255	1.32	
18	408.84	1738.04	85	26	49	139	2.40	
19	462.74	1971.05	38	29	59	200	1.09	NET < CL
20	510.30	2176.63	191	31	57	177	1.42	
21	582.57	2489.02	453	32	49	139	1.57	
22	608.71	2602.04	1308	42	45	117	1.44	
23	726.90	3112.82	126	23	42	89	3.58	
24	767.87	3289.88	108	22	40	86	1.13	
25	794.74	3406.01	87	18	32	50	3.21	
26	860.08	3688.33	53	18	34	73	2.31	
27	910.66	3906.90	373	22	23	28	1.86	
28	933.23	4004.42	78	16	27	39	1.84	
29	964.18	4138.15	77	22	42	67	1.67	a
30	968.24	4155.69	212	23	38	64	1.68	b

31	1119.84	4810.60	255	24	37	70	2.54
32	1237.76	5319.91	111	18	31	49	2.07
33	1281.01	5506.69	37	14	27	39	1.11
34	1377.33	5922.65	65	15	27	37	2.67
35	1407.67	6053.67	31	13	23	28	1.02
36	1460.54	6281.94	630	28	27	35	2.23
37	1588.03	6832.37	36	10	15	12	3.15
38	1729.69	7443.90	49	12	21	20	2.57
39	1764.55	7594.38	224	17	18	12	1.90

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GDR/PC RSSI High Resolution Gamma Spectroscopy Ver. 6.02a  
=====  
BACKGROUND SUBTRACT RESULTS  
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Sample ID : 082409 PIONEER B-22 4-6 670.2

Bkg File: . . . H:\GDR\BKG\NOCAL.BKG | Counting Start. . . . 10-17-08 13:07  
ID: . . . . . 24 Hour Background | Current Date . . . . 00-00-00 00:00

PK#	ENERGY (keV)	FWHM (keV)	OLD NET COUNTS	OLD UN- CERTAINTY	NEW NET COUNTS	NEW UN- CERTAINTY	FLAG
1	74.33	1.06	402	62	368	63	
3	83.67	1.02	104	59	101	59	NET < CL
6	92.29	0.95	238	58	188	58	
7	185.61	1.26	478	56	449	56	
9	238.15	1.15	1513	59	1489	59	
13	294.66	1.05	906	49	892	49	
17	351.36	1.32	1662	51	1606	51	
20	510.30	1.42	191	31	104	31	
21	582.57	1.57	453	32	430	32	
22	608.71	1.44	1308	42	1214	43	
27	910.66	1.86	373	22	350	22	
30	968.24	1.68	212	23	200	24	
31	1119.84	2.54	255	24	239	24	
36	1460.54	2.23	630	28	445	28	
39	1764.55	1.90	224	17	204	17	

=====  
GDR/PC RSSI High Resolution Gamma Spectroscopy Ver. 6.02a  
=====

NUCLIDE ACTIVITY SUMMARY

Sample ID: 082409 PIONEER B-22 4-6 670.2

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Sample Size . . . . . 6.70e+002 g | Spectrum File . . H:\maestros\082409.chn  
Sampling Start. . . . . 00-00-00 00:00 | Counting Start. . . . . 10-17-08 13:07  
Sampling Stop . . . . . 00-00-00 00:00 | Buildup Time. . . . . 0.00e+000 Hrs  
Current Date. . . . . 00-00-00 00:00 | Decay Time [OFF]. . . . . 0.00e+000 Hrs  
-----

Efficiency File.H:\GDR\EFF\500MAR.EFF | Library File. . . . H:\GDR\LIB\1001.LIB  
ID. . . . . . . . . 500 MARINELLI | ID. . . . . . . TH, U, AND K SERIES  
-----

Eff.= 1/[2.90e-002\*En^-2.65e+000 + 9.35e+001\*En^8.20e-001] 02-19-08 12:00  
-----

Gamma Fraction Limit >= . . . 10.00 % | Decay Limit <=. . . 8.000 Halflives  
Library Energy Tolerance. . . 1.20  
-----

FINAL ACTIVITY REPORT

Nuclide	Energy (keV)	Conc +- 1.00sigma (uCi/g)	Halflife )	Peaks (hrs)	Peaks Found
Pb-212	Average:	1.12e-006	+ -4.43e-008	1.06e+001	4 of 4
	74.82		I.D.Only		
	77.11		I.D.Only		
	238.63	1.13e-006	+ -4.47e-008		
	300.09	9.24e-007	+ -3.34e-007		
Pb-214	Average:	1.91e-006	+ -5.16e-008	4.47e-001	4 of 4
	77.11		I.D.Only		
	241.98	1.94e-006	+ -2.57e-007		
	295.21	1.82e-006	+ -9.97e-008		
	351.92	1.94e-006	+ -6.21e-008		
Th-234	92.80		I.D.Only	5.78e+002	1 of 3
Ra-226	186.10		I.D.Only	1.40e+007	1 of 1
Ac-228	Average:	1.19e-006	+ -6.18e-008	6.13e+000	3 of 3
	338.32	1.04e-006	+ -1.38e-007		
	911.07	1.23e-006	+ -7.87e-008		
	969.11	1.23e-006	+ -1.44e-007		
Tl-208	Average:	3.40e-007	+ -2.48e-008	5.09e-002	2 of 3
	510.84	2.93e-007	+ -8.78e-008		
	583.14	3.44e-007	+ -2.58e-008		
Bi-214	Average:	1.86e-006	+ -5.68e-008	3.32e-001	4 of 4
	609.31	1.83e-006	+ -6.41e-008		
	768.36	1.81e-006	+ -3.68e-007		
	1120.30	1.82e-006	+ -1.84e-007		
	1764.50	2.15e-006	+ -1.82e-007		
Bi-212	727.17	1.50e-006	+ -2.76e-007	1.01e+000	1 of 4
K-40	1460.80	5.96e-006	+ -3.81e-007	1.12e+013	1 of 1
TOTAL:		1.39e-005	uCi/g		

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UNKNOWN PEAKS

Energy (keV)	Centroid Channel	Net Counts	Un- Certainty	C.L. Counts	Bkg. Counts	FWHM (keV)	Net Gamma/sec
86.73	345.17	236	46	82	606	0.82	2.067e+000
89.23	355.98	166	51	97	716	0.95	1.398e+000
208.44	871.54	177	51	99	603	1.26	1.362e+000
270.31	1139.06	110	41	80	417	1.13	1.001e+000
327.57	1386.65	122	34	66	253	1.34	1.284e+000
408.84	1738.04	85	26	49	139	2.40	1.063e+000
794.74	3406.01	87	18	32	50	3.21	1.876e+000
860.08	3688.33	53	18	34	73	2.31	1.218e+000
933.23	4004.42	78	16	27	39	1.84	1.903e+000
964.18	4138.15	77	22	42	67	1.67	1.943e+000
1237.76	5319.91	111	18	31	49	2.07	3.434e+000
1281.01	5506.69	37	14	27	39	1.11	1.162e+000
1377.33	5922.65	65	15	27	37	2.67	2.206e+000
1407.67	6053.67	31	13	23	28	1.02	1.066e+000
1588.03	6832.37	36	10	15	12	3.15	1.377e+000
1729.69	7443.90	49	12	21	20	2.57	1.995e+000

## APPENDIX D

### Equipment surveys

- Equipment Survey

Instruments : Ludlum 3 with 44-9 probe (S/N 114040)

Date : 8/11/08 - 8/12/08

Date	Equipment	Background (cpm)	Actual (cpm)
8/11/08	Augers	50	50
	Split spoons	50	50
	Shovels	50	50
	Buckets	50	50
	Pipes	50	50
	Other equipment	50	50
8/12/08	Augers	50	50
	Split spoons	50	50
	Shovels	50	50
	Buckets	50	50
	Pipes	50	50
	Other equipment	50	50